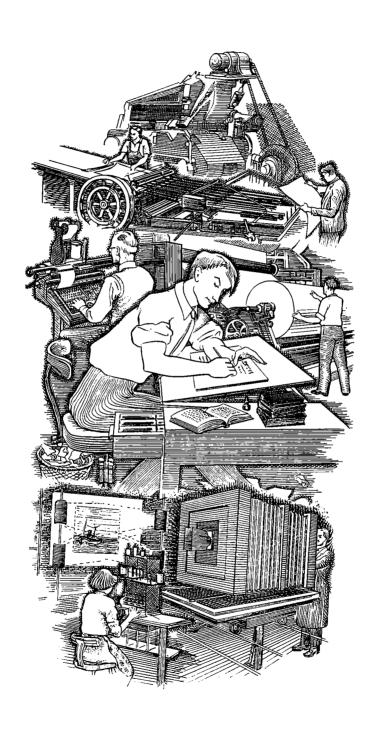
METHODS OF BOOK DESIGN



METHODS OF

BOOK DESIGN

THE PRACTICE OF AN INDUSTRIAL CRAFT

HUGH WILLIAMSON

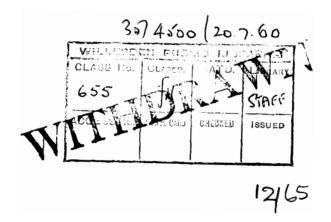


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Contents

	LIST OF ILLUSTRATIONS	iх
	PREFACE	хi
1	AN INTRODUCTION TO BOOK DESIGN	1
2	THE TYPESCRIPT §1 Some suggestions for authors, 10. §2 Proof correction, 11.	9
3	FORMAT §3 Sheet sizes, 13. §4 Folded sizes, 14. §5 Multiple sheet sizes, 17. §6 Mill and pr capacity, 18. §7 Format and function, 19. §8 Contents and format, 21. §9 Format a convention, 22. §10 The look of the thing, 22.	
4	MARGINS §11 Minimum margins, 23. §12 Wide margins, 23. §13 Proportions, 26. §14 Margins a convention, 27.	23 nd
5	TEXT COMPOSITION §15 Type-founding, 31. §16 Measurement, 32. §17 Letter design, 34. §18 Spaces and lead 35. §19 Letter nomenclature, 36. §20 Composition methods, 41.	31 ds,
6	COMPOSING MACHINES §21 The line-casting principle, 43. §22 The magazine, 44. §23 The matrix, 48. §24 Spaciand casting, 49. §25 Founts and series, 50. §26 Single-type composition, 51. §27 T matrix-case, 52. §28 Letter design, 54. §29 Spacing methods, 55. §30 Casting, 57. §31 T Monotype range, 57. §32 Special composition, 58. §33 Photo-composition, 59.	`he
7	CHOICE OF TYPE FOR THE TEXT §34 Availability, 63. §35 Letter-form, 64. §36 Legibility, 67. §37 Space, 69. §38 The tof the type, 70. §39 Imponderables, 72.	62 use
8	TEXT TYPES §40 Monotype Centaur, 76. §41 Monotype Bembo, 78. §42 Monotype Poliphilus, 78. §43 Linotype Estienne, 79. §44 Linotype Granjon, 80. §45 Monotype Plantin, 81. §46 Mortype Garamond, 81. §47 Monotype Van Dijck, 83. §48 Monotype Ehrhardt, 84. §49 Lintype Janson, 84. §50 Monotype Caslon, 85. §51 Monotype Old Face Special, 87. §40 Monotype Baskerville, 88. §53 Linotype Baskerville, 89. §54 Linotype Georgian, 88. §55 Monotype Bulmer, 90. §56 Linotype Caledonia, 90. §57 Monotype Fournier, 958 Monotype Goudy Modern, 92. §59 Monotype Bell, 93. §60 Monotype Fournier, 94. §61 Monotype Bodoni number 1, 94. §62 Monotype Bodoni number 2, 95. §63 Monotype Scotch Roman number 2, 97. §66 Monotype Scotch Roman number 1, 96. §65 Monotype Scotch Roman number 2, 97. §68 Monotype Modern Extended number 1, 97. §67 Montype Old Style number 2, 97. §68 Monotype Imprint, 98. §69 Monotype Lutetia, 970 Monotype Perpetua, 99. §71 Monotype Emerson, 100. §72 Monotype Romulus, 101. §73 Monotype Times New Roman, 102. §74 Linotype Electra, 103. §75 Monotype Spectrum, 104. §76 Linotype Pilgrim, 104. §77 Types for the future, 104.	10- 152 89. 90. m, 10- pe 10- 99.

9 PRINCIPLES OF TEXT DESIGN

108

§78 Text area, 109. §79 Fount, 111. §80 Word-spacing, 113. §81 Justification, 116. §82 Interlinear space, 116. §83 Indention, 118. §84 Special settings, 119. §85 Verse, 119. §86 Drama, 123. §87 Two-column setting, 123.

10 DETAILS OF TEXT DESIGN

125

§88 Punctuation, 126. §89 Capitals and small capitals, 129. §90 Extracts and quotations, 129. §91 Notes, 132. §92 Headings, 133. §93 Headlines, 135. §94 Page numbers and signatures, 137. §95 Chapter openings and initials, 139.

11 DISPLAY AND ORNAMENT

142

§96 Display composition, 143. §97 Display material, 143. §98 Type for display, 153. §99 Placing, 160. §100 Spacing, 164. §101 Surrounding space, 166. §102 Ornament, 166.

12 PRELIMINARY AND BACK PAGES

171

§103 The half-title, 172. §104 The back of the half-title, 173. §105 The trontispiece, 173. §106 The dedication, 177. §107 The title-page, 180. §108 The back of the title-page, 186. §109 The list of contents, 187. §110 The list of illustrations, 190. §111 Introductory text, 190. §112 Errata, 191. §113 Arranging the prelims, 191. §114 Appendixes, 192. §115 Notes, 192. §116 The list of abbreviations, 193. §117 Glossary, 193. §118 Bibliography, 193. §119 Acknowledgements, 194. §120 Index, 195. §121 The colophon, 196.

13 LETTERPRESS BLOCKS

200

§122 Making the line-block, 201. §123 Mechanical stipples, 203. §124 Printing the line-block, 204. §125 The half-tone block, 205. §126 Screens, 206. §127 Etching and mounting, 207. §128 Combined line and half-tone, 208. §129 Ordering blocks, 209.

14 LETTERPRESS PRINTING

210

§130 Printing from type, 210. §131 Stereotyping, 212. §132 Electrotyping, 213. §133 Other printing-surfaces, 214. §134 Mounts, 216. §135 Imposition, 217. §136 Make-ready, 220. §137 Inking, 223. §138 Platen presses, 225. §139 Cylinder presses, 226. §140 Perfectors and rotaries, 229. §141 Letterpress design, 230.

15 SURFACE AND RECESS PROCESSES

232

§142 Lithographic processes, 233. §143 The lithographic plate, 233. §144 Photolithography, 234. §145 Offset lithography, 235. §146 Transparent originals, 237. §147 Multi-metallic plates, 237. §148 Collotype, 238. §149 Gravure, 239. §150 Gravure screens, 241. §151 Silk screen, 242. §152 The choice of process, 243.

16 COLOUR

245

§153 The choice and use of colour, 245. §154 Colour in typography, 246. §155 Unmixed colour, 248. §156 Colour-mixing, 248. §157 Continuous colour, 249. §158 Stencil processes, 251. §159 Letterpress, 252. §160 Lithography, 254. §161 Collotype, 255. §162 Photogravure, 255. §163 Originals, 256. §164 Proofs and printing, 257.

17 ILLUSTRATION

260

§165 The artist, 260. §166 The subject, 262. §167 Style, 262. §168 Size and shape, 263. §169 Scale and trim, 267. §170 Position, 272. §171 Numbering, 273. §172 Underlines, 274. §173 Autographic illustration, 276. §174 Photomechanical illustration, 277. §175 Line illustration, 277. §176 Tone illustration, 279. §177 Calligraphy, 281.

18	PAPER 283
	§178 Fibres and pulp, 283. §179 Processing the pulp, 286. §180 The Fourdrinier machine, 288. §181 Separate processes, 291. §182 Coated papers, 292. §183 Hand-made and mould-made papers, 293. §184 Paper classifications, 295. §185 Paper specifications, 298. §186 Colour, 302.
19	BOOKBINDING 305
	§187 In-boards and library binding, 306. §188 Case binding, 310. §189 Imposition, 311. §190 Folding, 312. §191 Endpapers, 313. §192 Plates, 314. §193 Gathering and collating, 317. §194 Sewing and nipping, 317. §195 Trimming and cutting, 318. §196 Gluing, rounding, and backing, 318. §197 Lining and headbanding, 319. §198 Edge-colouring, 320. §199 Boards, 320. §200 Cloth, 321. §201 Case-making, 324. §202 Blocking, 326. §203 Cover printing, 328. §204 Lettering and decoration, 329. §205 Casing-in and jacketing, 330. §206 Some other methods of binding, 331.
20	THE JACKET 335
	§207 Display lines and text, 336. §208 Ornament and illustration, 338. §209 Production, 340. §210 Boxes, 342.
21	CASTING OFF 344
	§211 Approximate casting off, 345. §212 Accurate casting off, 347. §213 Making a fit, 348.
22	ESTIMATING 350
	§214 Different kinds of cost, 351. §215 Editorial, 355. §216 Composition, 355. §217 Illustrators, 356. §218 Materials, 357. §219 Imposition and duplicating, 359. §220 Printing, 359. §221 Binding and jackets, 360.
23	INTENTION AND RESULT 363
	§222 Layout, 363. §223 The choice of a printer, 365. §224 Specimens, 367. §225 Proofs, 369. §226 On the shelf, 370.
24	THE PURPOSES OF BOOK DESIGN 372
	PLATES 377
	APPENDIXES
A	FORMAT 393
В	TYPE MEASUREMENTS 395
	§227 Body-line, 395. §228 Set, 396. §229 Colour, 398. §230 Capital body-line, 399. §231 Capital height, 400. §232 X-height, 400. §233 Italic, 401. §234 Small capitals, 402.
С	TEXT FOUNTS AND THEIR RELATIONS 403
D	COLOUR ANALYSIS AND SYNTHESIS 408
	§235 Light and colour, 408. §236 Light and substance, 408. §237 Analysis and synthesis, 409. §238 Photomechanics, 410. §239 Colour mixing, 410.
E	BOOK LISTS 412
	§240 Examples of book design, 412. §241 Bibliography and bibliographies, 413. §242 Periodicals, 413.
	ACKNOWLEDGEMENTS 415
	INDEX AND GLOSSARY 417

List of illustrations

TEXT FIGURES

I	Standard sheet sizes 14	Alan Wykes's Pursuit till Morning
2	Parts of a section 15	(Random House) 163
3	Uncut page and sheet size 15	28 Letter-spacing on title-page - from
4	Verse in narrow format - from John	John Donne, Poems 165
	Donne, Poems (Balkmena) 20	29 Letter-spacing on title-page - from
5	Type area and page area 25	Apuleius' The Golden Ass (Penguin
6	'Contemporary' typography - from	Books) 167
	Sophie Taeuber-Arp (Holbein-Verlag) 28	30 Narrow colophon setting - from Gloria
7	Important parts of type 32	Komai's Marcus Aurelius (Sylvan
8	Parts and dimensions of type-face 34	Press) 169
9	Parts of letter, and serifs 34	31 Mechanism of half-title 172
10	Capitals and small capitals 37	32 Double-spread title-page - from U. P.
ΙI	Linotype, matrix, and slug 45	Hedrick's Fruits for the Home Garden
12	Complex Linotype setting - from The	(Oxford) 174
	Interpreter's Bible (Abingdon-Cokes-	33 Combined title and frontispiece - from
	bury) 46	Valenti Angelo's The Bells of Bleecker
13	Parts of Monotype caster 53	Street (Viking Press) 178
14	Four Caslon founts compared 76	34 Device of Jehan le Royer - from Livre
15	Romain du roi 91	de Perspective de Jean Cousin 181
16	Didot's roman and italic of 1784 93	35 Printers' and publishers' devices 183
17	Unjustified setting - from Mirandola's	36 Engraved title-page - from Bernard
	Oratio de Hominis Dignitate (Anvil	Shaw's The Adventures of the Black
	Press) 114	Girl in her Search for God (Constable) 185
18	Page of verse with long lines - from	37 Contents in narrow measure - from
	P. C. Boutens' Verzamelde Werken	The Return of King Od ysseus (Oxford) 189
	(Boucher) 120	38 Making the line-block 203
19	Rules instead of quotes - from Alan	39 Mechanical stipples 204
	Paton's Too Late the Phalarope (Cape) 127	40 Six kinds of printing surface 215
20	Three-column make-up - from the	41 Forme with bleeding blocks 219
	Nonesuch Herodotus 130	42 Ink duct 224
2 I	Diagonal title-page border - from	43 Seven letterpress printing machines 228
	More's Utopia (Limited Editions	44 The three main methods of printing 232
	Club) 147	45 Offset lithography press 235
22	Type border on title-page - from The	46 Sheet-fed rotary gravure press 240
	Nonesuch Century 149	47 Spectrum of white light 246
23	Illustration by cast ornaments - from	48 Reflection range of trichromatic inks 251
	the Nonesuch <i>Iliad</i> 150	49 Unconventional book illustration -
	Handwritten title-page - from Paul	from Rainier Maria Rilke's Five Prose
	Standard's Calligraphy's Flowering,	Pieces (Cummington Press) 264
	Decay, and Restauration (Society of	50 More unconventional illustration -
	Typographic Arts) 157	from Alfred Kazin's A Walker in the
	Handwritten display and notes - from	City (Harcourt, Brace) 268
	Standard 159	51 Trimming illustrations 271
	Old and modern styles in display -	52 Reduction along diagonal 271
	from T. L. De Vinne's Correct Com-	53 Simulation of tone with line process 279
	position 161	54 Breaking and beating engines 287
27	Off-centre chapter opening - from	55 Wove and laid paper 289

56	Fourdrinier paper-making machine	290	67 Trimming off projecting bolts	312
57	Mould for making paper by hand	294	68 Fixing plates into the book	315
58	Two kinds of endpaper	307	69 Gathered sections with collating marks	317
59	Sewing in hand-binding	307	70 Oversewn sections	317
60	Rounding and backing	308	71 Cased book before casing-in	319
6 r	Headbands	308	72 Case-making	325
62	Lacing cords into boards	309	73 Hand-bound bookwith Frenchgroove	325
63	Oxford hollow and fixed back	309	74 Casing-in	331
64	$\frac{1}{4}$, $\frac{3}{4}$, and full binding	309	75 Side- and saddle-stitching	332
65	Library binding	310	76 Estimating form	352
66	Binding in boards and in a case	311		

PLATES

77 The printing of type	377	82 Endpapers	386
78 The reproduction of continuous		83 Spine lettering	387
tone	379	84 Jackets	388
79 Deep-etched half-tone	381	85 Rough layout	390
80 Alignment of small blocks	382	86 Fair layout	391
81 Binding cases	384	87 Finished layout	392

TYPE EXAMPLES

Solid and letter-spaced capitals	36	Word-spacing in verse	121
Complete text fount	38	The spacing of punctuation	128
Numerals	38	Three kinds of sub-heading	135
The Times family	39	Initial with trimmed beard	140
Examples of 6 to 72-point type	40	Mortised initial	141
Letter-spaced capitals and small capi	itals 55	Five kinds of rule	144
Three kinds of word-spacing	56	Four old display types	146
Oblique and vertical stress	65	Five 20th-century display types	152
Examples of 37 text types	76-104	Titling initial with short beard	152
48-point Perpetua	100	Four titling types	153
The Romulus family	101	Some initials	154
Short oblique stroke in punctuation	105	Four open display types	155
Too many ens in the line	II2	Three non-roman display faces	156
Inadequate leading	117		-

Preface

In the chapters that follow, book design is taken to mean such planning of the printed book's manufacture as affects its appearance and structure. The sub-editing needed by some typescripts, and carried out by many book designers, is not strictly a part of book design, but is also touched on here. For the most part, it is the design of the industrially produced book which is discussed in these pages; the hand-made printed book is not considered in detail.

The printed book has appeared in innumerable forms, some differing radically and others in detail from the general run. Liturgical books, books of reference, and cheap reprints, for instance, all pose their own problems of design. To delve into these would be pleasant and might be instructive, but the preparation of many special kinds of book, equally interesting, would still remain undiscussed. The whole craft of book design cannot be described in a single book; what is attempted here is rather a description of the principal tasks and problems of the non-specialist designer. One form of detail which would have been particularly valuable is the price of the various techniques and materials, since an effective control of costs is the basis of industrial design. Prices, however, tend to change so frequently and so radically that they have had to be omitted.

Any book designer may therefore find a good deal left unsaid in these pages, and technical advances and changes of fashion and taste will widen the gaps in the structure. The remedy is to bear in mind the main purposes of book design, and these are summarized in chapter 24.

The aesthetics of book design are not easily described, if indeed they can fairly be described at all. Taste and fashion have their influence here, and the tendency is towards continual slight change. To lay down rules of style is easy enough—one has only to consider how things were done yesterday, or how they are done today, or how one prefers to do them oneself, and to elevate these practices or preferences to the status of dogma. Principles of graphic design which apply to all kinds of book production, which will continue to apply for longer than a year or two, and which need to be stated, are much less easily found. The main points about legibility can be asserted; but in deciding what kind of pattern the printed image should make, the typographer should rely on his own ideas rather than on those of writers who discuss his craft. The conflict between traditional and unconventional styles, for instance, will not be terminated by any opinion put forward in a book; nor can any book describe or illustrate all the innumerable valid styles of typographical arrangement. The

xii PREFACE

importance of aesthetics in book design tends in any case to be overrated. An hour spent on planning which makes possible a perfect impression of text type on paper is worth two hours of searching for an original and striking arrangement for the title-page; printing is a mass-production technique of communication, and effective communication and production matter more than patterns. For these reasons the aim of this book is to show something of the possibilities of industrial book design rather than to say what use should be made of them.

Although its importance must not be overrated, the aesthetic side of book production exists. To plan a technically faultless book is indeed a rare achievement. Only those who are capable of doing it can move with certainty among such subtleties as the arrangement of printing types not merely in a legible but in a beautiful style: the appreciation of the minutiae of type design and presswork: the aesthetics of book illustration: and the vague but deeply interesting problems of art, atmosphere, and allusion in typography. There are wide fields of experiment to be explored too; books may not keep their present form for ever, and there may be decades of change, as typographic revolutionaries have been rather stridently declaring for some time. Worth-while changes are likely to be brought about only by typographers who understand the traditions and techniques of book production. All this lies outside the scope of this book, in which the designer is shown something of the methods he will use; the exercise of typographic art and experiment may be the rewards of his mastery over these methods.

In Britain at least, convention is the most powerful single influence on style in book design. How far convention is to be obeyed must be for each designer to decide, so long as his decision is based on an understanding of the traditions he may wish to discard. The predominance of conventional styles must, however, be recognized; and where a conventional point of style is recommended in this book, it should not be taken as a recommendation for conventional styles in general so much as an indication of how such styles, if they are chosen, may be carried out.

For the purpose of description, the various matters with which a typographer has to deal, in the course of planning a book, have been separated one from the other and arranged in order. The mental processes involved in book design, however, are not separated and arranged in this way; it is impossible to determine format, for instance, until something has been settled about the composition of the text. The designer has to bear several matters in mind at once; and when in the course of his planning he has to pass on from one decision to the next, the second may compel him to revise the first. The order of chapters is that in which, for some books, decisions might logically be made, so far as they can be made independently of one another. The attempt to provide a logically coherent account

PREFACE xiii

of technical matters has resulted in the inclusion of some extremely obvious statements, such as the fact that each printed colour usually requires a separate printing. This fact, however, is the foundation on which today's technique of colour printing is built, and must be mentioned.

In the pages which follow there is little that is new. Book design is described mainly as it is practised today, but some methods not in general use are included; if these have not been suggested before, or are not in use by British or American designers, they are as a rule supported by argument. The student should not suppose that all the styles proposed are strictly orthodox. The writer has found that no writer on typography can claim a monopoly of sound opinion, and draws to his reader's attention the book lists at the end of some of the chapters and in appendix E.

Books on printing design tend to be elaborately illustrated, and in some the illustrations occupy more space than does the text. When the visual quality of printing is the subject, this doubtless is a good practice; here, however, the subject is rather the editorial and technical as well as the aesthetic aspects of the planning of printing. Illustrations have therefore not been included for their own sake, as they would have been in an attempt to demonstrate at least the most popular styles of the day; instead, only those textual points have been illustrated which might otherwise be obscure. Those who wish to study the styles of the past and present will spend their time better in bookshops, libraries, and museums than between the pages of books on typography. They will certainly learn more about paper and presswork than illustrations could show.

In order to simplify the text pages, the underlines of the illustrations refer only to the specific points which are illustrated. Further details about some of the illustrations appear in the list of illustrations on page ix. For the same reason, the full bibliographical descriptions of publications do not appear on the text pages if they are given in one of the book lists. In general, textual references to other parts of the book are by means of the numbers of sections; the purpose of such references is usually to indicate that something is more fully explained later, rather than to suggest that the reader should necessarily refer to the passage indicated.

At the end of some of the chapters, and in appendix E, a few books are recommended for further reading and for reference. Some of these have bibliographies, and there are some full-length bibliographies in §241; these will show the reader something of the vast extent of printing literature, and if he wishes will lead him on to more detailed study.

These short book-lists contain by no means everything the studious designer will wish to read. They are intended to be no more than an introduction to the literature of their subject. After chapter 14, for instance, the sole book on ink is that of BURNS, a small octavo of only

xiv PREFACE

64 pages; there are many longer books on ink, but the subject is not one that most designers need to know intimately, and this book will probably give the reader all he needs. Many books of value and interest have been left out because they deal with matters not discussed at any length in these pages, and it has seemed best to limit the number of titles recommended. The history of typography, for example, is no more than touched on, since this book is technical rather than historical.

On the whole, I have preferred to include books which are in English (since I have little first-hand knowledge of untranslated foreign literature) and which can be bought, or at least seen, without great difficulty. Nearly all the books mentioned are in the printing library of the St. Bride Foundation in London.

When a book is one of a series, the series title appears in parentheses after the book title. Unless otherwise described, books have no bibliography or illustrations, are octavo, in cloth or paper boards, and were published in London.

Only for quite a small number of specialists is book design a full-time activity, but it is the concern of almost everyone occupied with books. It is in the interest of any author to have his work presented to the reader in the clearest and most attractive style possible: the design of books is the speciality of the publisher's book-production manager, and of the typographer in publishing house or printing office: the publisher, the master-printer, and the printing manager are all involved in the effort to achieve and maintain quality in book production: and those who buy and sell books will do well to know the difference between a well- and a badlyproduced book. To students and teachers in printing schools and technical colleges, book design is the core of typography, although their courses may be concerned rather with the design of advertisements and of other forms of display typography derived from that of books. Since such a variety of people, equipped with such various degrees of technical knowledge, may be interested in book design, it is described here as to a reader with little or no technical knowledge. Processes are explained from the beginning, but chapter 5 (Text composition) is the only chapter which contains technical matter only; all the rest include some discussion of design.

Book-production techniques are constantly developing, and there is not room here to describe all the new processes and materials which are beginning to come into use, however promising they may appear. Technical discussion is limited to the principal methods which either are already in use or very soon will be; it is intended only to supply the printing designer with the minimum of technical knowledge which must be the first tool of his craft, and to show the relationship between design and technique.

An introduction to book design

By a *Typographer*, I do not mean a *Printer*, as he is Vulgarly accounted, any more than Dr. *Dee* means a *Carpenter* or *Mason* to be an *Architect*: But by a Typographer, I mean such a one, who by his own Judgement, from solid reasoning with himself, can either perform, or direct others to perform from the beginning to the end, all the Handy-works and Physical Operations relating to *Typographie*.

Such a Scientifick man was doubtless he who was the first Inventor of Typographie; but I think few have succeeded him in Science, though the number of Founders and Printers be grown very many: Insomuch that for the more easie managing of Typographie, the Operators have found it necessary to devide it into several Trades, each of which (in the strictest sence) stands no nearer related to Typographie, than Carpentry or Masonry, &c, are to Architecture.

—JOSEPH MOXON: Mechanick Exercises: Or, the Doctrine of Handy-works Applied to the Art of Printing. The Second Volumne (London, 1683).

Very early in the second century of the Christian era, Ts'ai Lun, a mandarin at the Imperial Court of China, announced the invention of paper. It was made of old rags and fishing-nets, worn-out hempen sandals, and the inner bark of trees, mixed with water, pounded to pulp, and spread out on a flat board to dry. The raw materials were cheap and plentiful, the simple process was soon improved by diligent craftsmen, and the demand was widespread. Before long paper was being made all over the empire, and Ts'ai Lun was raised to the peerage by a gratified emperor.

The advantage of paper, over the various writing-surfaces in use at the time of its invention, lay in its combination of valuable qualities. Silk, for instance, commonly used in China, was particularly well suited to brush writing, but was expensive. Papyrus—a brittle, fragile sheet of pressed reeds—was cheap, but difficult to use and even more difficult to keep. Parchment, at its best the perfect writing-material, was too costly for commonplace use. Paper, on the other hand, was neither rare nor costly,

its surface was excellently suited to the delicate calligraphy of China, and if properly made it would last for centuries.

The first result of the use of the new material was the increased production of written texts, and hence the spread of literacy across the Chinese empire. The abundance and low cost of paper, however, led to the idea of duplicating instead of writing. Even on paper, a written text was a costly possession; calligraphy, one of the great arts of the East, was expensive in itself when it was the work of professional scribes. Paper could be made faster than it could be covered with writing.

Some four or five centuries after the invention of paper, printing also entered the world by way of China. Inked seals were already used, as a form of signature or ratification on a document. Now the principle of impression from a relief surface was extended, at first to reproducing by the thousand the little paper charms, each marked with a sacred text, which in Buddhist rites were permitted to take the place of oral repetition, and then to the printing of books from carved wood blocks. The oldest printed book known to be still in existence was made in China during the ninth century.

The next step was to apply methods of mass production to the writing itself, as to its reproduction. The thousands of intricate characters of a long text could not be rapidly carved in wood, and each character had to be carved afresh for every appearance in the text. In the eleventh century movable types, baked in clay, were used for the first time, also in China. Metal types, cast from a sand matrix shaped by a wooden punch, came into use in Korea three centuries later, each character being fitted into place in a grille of bamboo rods.

The process of sand-casting, by the methods then in use, was not precise enough for the accurate reproduction of Eastern calligraphy. Printing by pressing paper by hand against the type was a slow business. Equally discouraging, the non-alphabetic orthography of Asiatic languages required the use of thousands of different characters, so that a vast equipment of types was needed for the setting up even of a single work. Printing from movable types never gathered strength enough to break past the religious conservatism of the new Moslem empire to the West, nor enough vitality to survive in China, where it died away during the eighteenth century.

The craft of paper-making, meanwhile, had been advancing slowly across the Moslem world to Europe, where its arrival in the 12th century was followed in the 14th by the beginning of manual printing from wood blocks, and in the 15th by the European invention of movable types. Although about a thousand years had passed since the Chinese invention of printing, and several centuries since the first use of type, there is no evidence that the first typographic printer of Europe derived his methods

from the East. Indeed, he achieved more in a decade than the Asiatic printers had achieved in a millenium; European typography sprang from the head of its inventor fully armed at all points. It was not so much the invention of a new principle as a synthesis of mechanic exercises already being practised.

The skill of the metal-worker, perhaps the most notable of these crafts, was used to prepare metal types which not only reproduced written letters with precision but which were cast on metal bodies so accurately squared that after a little 'dressing' by hand, they could be fitted against each other to leave no unnecessary space between the letters. The relief engraving of a letter on a punch, the stamping of the punch into a matrix, and the casting of a type from the matrix were the core of the new process. The singleletter punch was already in use for the lettering of book-bindings and the sand-casting of relief inscriptions; the single-letter matrix and cast were new. The water-colour ink used for printing from wood blocks would have been useless with metal types, and the oil-bound pigments recently brought into use by European painters were adapted for printing; something similar must, of course, have been discovered in Asia for printing from metal. The screw-press, which at one impression could apply a fairly even pressure over comparatively wide areas, was already in action among related trades, for drying paper, printing textiles, and pressing newly bound books, and was easily adapted for printing several pages of type at a time. Bookbinding was already an ancient craft, and the page with text on both sides, fixed to its neighbours at one edge and protected by a hide cover, had evolved from the codex a thousand years before.

The synthesis of techniques already in use was one major advantage of European over Asiatic typography; the other was the difference between the small number of letters in the alphabet and the thousands of different characters used by the Chinese. In non-alphabetic writing, each character represents an idea, or a word, or at least a syllable. Such writing needs a number of characters too great for economical reproduction by typography. On the other hand, the number of sounds used in the spoken form of most languages is limited, and some alphabetic letters can be used to represent more than one sound. All true alphabets consist of few enough letters to lend themselves to composition in type.

The emergence of the alphabet from syllabic and other systems is hidden in antiquity. The earliest known alphabetic characters, derived from the pictorial script of Egypt, and arranged in roughly vertical lines, were scratched on sandstone by Semitic miners, working in Egyptian captivity in the Sinai desert nearly 2,000 years before the invention of paper. Since the first Semitic orthography relied entirely on consonants for meaning, and only later used vowel marks as an aid to reading, the letters represented

consonants only. There were other radical differences between the earliest alphabets and the roman alphabets in use today. There was one alphabet only, for instance, instead of a mixture of capitals and small letters in roman and italic; there was no space between words, nor any punctuation; the direction of writing, vertical at first, changed to horizontal, to read not only from the left but sometimes from the right, and at some stages alternately from right and from left.

As the alphabet descended from its ancestor of the Jewish exile, its development was influenced by the needs and methods of those who used it, although the Hebrew alphabet to this day follows its ancient pattern, reading from right to left, and without different small letters or letters representing vowels. The Greeks, to whom vowels were an essential part of the word, transferred some of the characters to vowels, eventually standardized the direction of writing to read from left to right, and introduced a simple system of punctuation. The Latins began to separate words, and to shape the letters now familiar as roman capitals. The use of lettering tools other than the knife, such as the pen, and of comparatively smooth surfaces such as papyrus, parchment, and wax instead of stone, accelerated the development of roman letter-forms. Curves began to replace the rigid lines of the earlier style; in the less formal and more rapid scripts, strokes began to flow above and below the even alignment of the older letters; and small letters, of varying formality and cursiveness, appeared to supplement the capitals. Under the authority of Charlemagne, the roman alphabet took on something of the form in which it is known today, but this was only one of innumerable styles of the period which differed radically from each other. In the hands of the professional scribes of the monasteries, and under the influence of the high cost of parchment, the roman letter developed into decorative and economical styles, heavy, narrow and angular, known today by such names as Black Letter. These styles are not easy to read, nor do they lend themselves to the practice of amateurs or to rapid writing. The Renaissance and the spreading use of paper aroused a demand for more and clearer books and writing, and revived interest in the arts of earlier centuries; professional scribes and humanist scholars began to turn away from the various forms of Black Letter they contemptuously termed Gothic or barbarous, towards a new form of the rapid, clear, and open alphabet of Charlemagne, the roman capital and the Caroline minuscule. In this period of change the European invention of printing from movable types took place.

Until this time the letters of the alphabet had been almost constantly changing and developing in design. It is possible that, if handwriting had retained control of this development, changes of form would have continued, and there might even have been changes of function, brought

about by the influence on letter-form of the needs of whole nations and generations of new writers and readers. The spread of culture across national boundaries might have begun to equip the alphabet with symbols generally used with or instead of conventional letters to represent any sound used in the speech of any language, so that to see a language written would be to know how it is pronounced, and even to observe details of emphasis and inflection. The spread of literacy and the general need for rapid writing might have compelled it to develop a form in which it could be written nearly as fast as a man can talk. The discovery of photographic methods of reproduction in printing might have begun to replace the traditional printed letter with some other form of alphabet which anyone could write quickly and all could read, so that an author would no longer require a compositor to interpret his meaning to the reader. Instead, the alphabet has to be supplemented by symbols and systems, such as phonetic and short-hand, familiar only to the specialist, and the attempt to write the elaborate forms of roman letters at the speeds necessary or useful today has reduced much handwriting to a scribble.

Within decades of the European invention of movable types, the printers became custodians of letter-design. Their tendency to preserve existing letter-forms in spite of the changing needs of the literate world was natural; they were not professional calligraphers, and their equipment was not so easily changed as the direction of a pen. After centuries of development, the letters of the roman alphabet began to harden into their permanent form. In that very period when printing began to grow from a medieval craft to a modern industry, the long history of the development of the forms and the methods of arrangement of roman letters approached its end.

As the printing trade developed, its nature as a synthesis of separate crafts did not change. Composition and presswork remained the central mysteries of the typographic art; around this centre, the related crafts were linked to it and to each other. Within the trade, the craftsman tended to be a specialist, fully skilled in one technique only. As the book-production industry grew, its members began to set up as independent tradesmen, dealing with printers in general rather than working in the employment of one. Early in the 16th century, for instance, the first independent typefounder offered his founts to the trade, although to this day a few printers have continued to employ their own typefounders. Other crafts on which the printer depended, such as those of paper-making and bookbinding, did not rely on the printer for the whole of their custom, and at the most were never more than partly assimilated into the printing trade.

The technical development of this complex of different skills was slow at first. For the four and a half centuries during which text type was composed by hand, the choice of types for any particular book was hardly a problem; the majority of printers were not equipped with more than a very few founts in one size, and in view of the lack of variety in paper and in printing processes, these few were generally enough. Until the late 19th century, when the use of the camera for graphic reproduction became general, the original letterpress or relief method of printing dominated book production—the choice of alternative processes for illustration tended to be regulated by fashion and by the preference of the illustrator—and since as a result no great variety of paper surface was necessary, the selection of paper and process was simple enough. Bookbinding was already a very ancient craft when type was first set up in Europe, and until the early 19th century the fundamental method of the hand-binder had no rival. So long as book production was mainly a manual craft, therefore, the selection of methods and materials for the general run of books presented few difficulties or opportunities.

During the 19th and 20th centuries book production, in company with other crafts, developed into a mechanical industry. Today, for instance, punch-cutting, type-casting, and text composition are tasks for the machine, and half a dozen or more text founts in any one size are normally among the equipment of any book printer. Letterpress printing is carried out on a variety of cylinder presses, and is complicated by the use not only of stereotyped and electrotyped duplicates of the printing surface but of the half-tone system of dots of unequal size to simulate continuously graded tones, and of the different kinds of paper surface necessitated by this system. The introduction of photography into printing has brought surface and recess printing processes into use for the reproduction not only of illustrations but of type; each process requires different kinds of paper, and has a different effect on the appearance of what is printed. Mechanical bookbinding makes use not only of a method of construction radically different from that used for centuries by hand-binders, but of cheaper and less durable materials of which a much wider variety is available.

This complexity of techniques, equipment, and material, which is still increasing, enables the book-production industry to offer much to those who know how to make the best use of its powers—greater regularity and variety of letter-form, for instance, greater evenness of impression, and greater variety of result in illustrations than were possible two centuries ago. On the other hand, the opportunity to produce entirely successful books is less easy to grasp today. The variety of materials and methods offers not only the chance to choose but the risk of a wrong choice. Even when the right process and material have been chosen, their possibilities may not always be exploited to the full. The elaboration of techniques,

making each craft more difficult, has combined with trade-union practice to reinforce the separation between crafts within the trade and allied to it; and although the crafts are naturally able to work together to a limited extent, entirely successful co-ordination in the production of a book is usually the result of guidance from outside the crafts. Co-ordination is vital, for if the book is to be a coherent whole, handsome and soundly made, its parts must be planned to suit each other in both appearance and construction. The tendency of the printer's functions to become separate trades, which began with typefounding, has continued, and publishing and bookselling are no longer a part of the master-printer's work. In parting with the financial responsibility for book production, printers have had to surrender a part of their control of methods, materials, and style, so that if this control is not exercised from outside the printing trade there may be times when it is not exercised at all. Quality in printing has always to be maintained by constant exertion; when the tasks of book production are divided among specialist firms such as paper-makers, process engravers, printers, and bookbinders, the maintenance of quality, as well as the co-ordination of method, has to be imposed to some extent from outside all these trades.

Above all other demands on taste and skill is the problem of the right use of type. The printed letters of today are 15th-century letters, arranged to a large extent in a 15th-century manner; without violating the generally understood conventions on which all systems of communication depend, these letters have to be set in a style which will suit the 20th-century reader, whose method, accelerated by the widening popularity of the novel during the last 200 years, is often to skim over the text rather than to study it. Very little can be proved about legibility; the ancient letters we use, and the even older manner in which they are combined into words and lines, seem to be out of reach of the logic of today. In the planning of composition, instinct, practice, and taste are often safer guides than theory.

It is by means of planning or design that quality in book production is maintained and advanced in the circumstances of today. In this sense, book design means all the planning which determines the visual and structural qualities of the book. Typography, now generally understood to mean the planning of composition (though used in Moxon's time, and still today, in the sense of printing from movable types), is clearly a major part of the task, but although the book designer may also be termed a typographer his influence must extend not only to composition but to all the book-production crafts grouped round the printing trade. Book typography cannot succeed without, for instance, good paper, good presswork, and good binding. Anyone who carries out a part of this planning may be said to take part in book design, even if he is content merely to design the

composition. Book design, however, tends to be at its best when carried out by a single designer, who can prepare a coherent plan for every stage of the book's production; and in writing of book design, it is simpler to assume the existence of such an omni-competent typographer.

His ability springs from a combination of taste with technical know-ledge. Since he is to exploit to the full the techniques and materials of a modern industry, he must understand them to the full. As for some 3,500 years handwriting was adapted to the requirements of writer and reader, so type composition must be designed to serve the author's purpose and the convenience and pleasure of the reader. The low cost of production brought printing into being, and remains the source of its strength; the typographer's plan for the book must be precisely assembled in terms of what is economically possible. It is the practice of this exacting form of industrial design which appears in outline in the chapters that follow.

BOOKS

- ALDIS, HARRY G. The printed book Cambridge University Press: 3rd edition, revised and brought up to date by John Carter and Brooke Crutchley, 1951 illustrations: bibliography. [An historical guide.]
- JENNETT, SEAN The making of books Faber and Faber, 1951 illustrations: bibliography. [A comprehensive account of book design and production.]
- McLEAN, RUARI Modern book design Longmans Green, for the British Council, 1951 limp: illustrations: bibliography. [A survey of 20th-century book design.]
- MORISON, STANLEY First principles of typography (Cambridge authors' and printers' guides, number 1) Cambridge University Press, 1951 pamphlet. [An authoritative essay, first published in its present form in 1930.]
- MORISON, STANLEY The typographic arts: two lectures Sylvan Press, 1949 illustrations. [Lectures to the British Academy in London, and to the Royal College of Art in Edinburgh, tracing the connexion between palaeography and typography.]
- MYRICK, FRANK B. A primer in book production New York, 1945. [On the work of the publisher's book production manager in America.]
- ROGERS, BRUCE Paragraphs on printing, elicited from Bruce Rogers in talks with James Hendrickson on the function of the book designer - New York, 1943 - quarto: illustrations: bibliography.
- SIMON, OLIVER Introduction to typography Faber and Faber, 1945 new edition, Penguin Books, 1954: limp. [Both editions contain many type examples and other illustrations, and have a bibliography. The author discusses the principal aspects of book design as well as typography alone.]
- STEINBERG, S. H. Five hundred years of printing Penguin Books, 1955 limp: illustrations: bibliography.
- UNWIN, SIR STANLEY The truth about publishing Allen and Unwin: 6th edition, 1950. [Contains a chapter on the work of the publisher's book production manager in Britain.]
- UPDIKE, DANIEL BERKELEY In the day's work Harvard, 1924. [Essays on printing and book production by a great American master-printer.]
- UPDIKE, DANIEL BERKELEY Some as pects of printing old and new New Haven, Connecticut, 1941. [More essays.]
- WARDE, BEATRICE-The crystal goblet: sixteen essays on typography, selected and edited by Henry Jacob Sylvan Press, 1955 with type examples. [The most vivid and stimulating of writers on typography.]

The typescript

The first step in the production of a book may be taken before the book is written. Not all writers understand that the preparation of a clear and orderly typescript is a part of their craft; and of those who do realize this, not all know how to go about it. It is up to the publisher to explain to the writer what kind of typescript will best suit both publisher and printer.

A well-made typescript—'good copy'—enables the keyboard operator to set type from it at full speed, without having to pause for cogitation. 'Bad copy'—obscurely written manuscript, or typescript heavily corrected or untidily prepared—is difficult to handle, wastes the operator's time, and so increases the cost of composition; this extra charge is certain to appear in the printer's invoice, and may even be reflected in the published price of the book. Calculation by the printer of the number of characters in the typescript, if the copy is bad, entails much laborious work; and the inconsistencies and obscurities of bad copy are always likely to cause such mistakes as the setting of headings and sub-headings in the wrong style, and the misplacing of illustrations and parts of the text.

Ideally, the typescript should be such that the number of characters in the text can be calculated with reasonable accuracy by the use of averages: the author's intentions with regard to the style of spelling, punctuation, hyphenation, headings, notes, quotations, and so on are quite clear: the text itself is easy to read, and so arranged that there is room for alterations if necessary: and the sheets of the text are easy to handle, in size and thickness, in binding, and in including no extraneous matter not intended for the keyboard.

Where possible, the publisher will do well to discuss the preparation of a complex typescript with the author before typing begins. Not all authors can be expected to know what typographic material is available for the differentiation of heads and sections, nor how a complicated text can best be arranged. Usually, however, the publisher has to rely on a printed sheet or pamphlet of suggestions, which can be circulated to all who are likely to submit typescripts. Such suggestions usually deal with the preparation and correction of the typescript, include some guidance to style, and give

a short list of authoritative books on orthodox spelling, grammar, punctuation, and so on. The most important suggestions are listed in § 1.1

§1 · SOME SUGGESTIONS FOR AUTHORS

All copy submitted for printing should be typewritten for the sake of legibility and to enable the number of characters in the text to be calculated by averaging.

For the convenience of the keyboard operator, the typescript should be double-spaced on one side only of quarto sheets (say 8 inches wide by 10 inches) of a reasonably stout bond paper (say large post 18 lb.). Since the operator places one leaf at a time in his copy-holder, the type-script should not be sewn and bound in book form; the sheets should be stapled or pinned together at the top left-hand corner only, chapter by chapter, or fixed into a file from which sheet after sheet can easily be removed. An author who prefers files—and in many ways they are best—can save himself trouble by getting a stationer to punch holes in the paper before typing.

For safety, there should be at least one carbon copy of the typescript, and this may be on thinner paper than the top copy—perhaps on a typing flimsy. An author who expects heavy corrections to his typescript before printing would do well to prepare both an original and a duplicate on bond paper, use the duplicate for correction, and then copy the corrections clearly on to the original. Corrections to the typescript should as far as possible be marked in accordance with the standard proof correction marks.² In any case, when the typescript goes to the publisher, a copy should always remain at home. The top copy should always be sent to the publisher for the printer.

The left-hand margin should be not less than 1½" wide, in order to leave room for any alterations that may be necessary. Every line in the typescript should be as near as possible to the average width, and each folio,³ except where room is occupied by headings and so on, should contain the same number of lines.

All the folios should be numbered consecutively throughout the book. Anything that has to be added after the typescript is complete but cannot be clearly added to an existing folio should be typed on a separate folio and given such a number as 29a. Corrections to whole paragraphs may be made by re-typing the paragraph and gluing the new version over the old; pins and staples should not be used.

¹ See also Preparation of manuscripts and correction of proofs (below).

² Authors' and printers' proof corrections (below). ³ Page of manuscript or typescript.

Everything that is to be set up in type should be included in the type-script, and nothing else. Illustrations should be kept separate, numbered, and their position indicated in the text. Where the type is to be run round illustrations in the text, the position and dimensions of the illustration—as agreed with the publisher—should be indicated in the margin. Captions should be typed together on separate folios, unless set in the same size of type as the text; and if there are many long footnotes scattered throughout the text, some printers may prefer to have them typed separately too.

The typescript should be carefully read before being sent off to the publisher. The publisher pays for an agreed amount of proof correction, but the balance above that amount is charged to the author. The author's name and address should appear on the first page of the typescript. A typescript sent through the post should be stoutly wrapped and registered, and its receipt acknowledged by authors, agents, publishers, and anyone else to whom it is sent.

(The publisher may also do well to mention illustration processes, explaining in particular the special binding processes necessary for pictures which have to be printed separately from the text—§ 192.)

§2 · PROOF CORRECTION

Proof correction is also worth more than a paragraph of explanation; an author who understands the technique of correction can save himself, the publisher, and the printer much time and cost. All major insertions and deletions should be carried out on the galley proofs (§ 20); but even at this stage, the author can save much re-setting if, on inserting a sentence or a phrase into a long paragraph, he can delete exactly the same number of characters and spaces—or add enough to make a full line. Corrections should be marked according to *Printers' and authors' proof corrections*, and the more common of these may be incorporated with the publisher's suggestions about proof correction.

The author should do his best to avoid adding or subtracting a line after the galleys have been divided into pages; and the difficulty of making corrections after imposition (§ 135) should be explained by the publisher. Some explanation of how corrections are charged, and of how they become more expensive in the later stages of proof, may benefit both author and publisher.

This kind of ante-natal care is not vital to book design, but, particularly where complex and difficult books are in hand, an author's knowledge of the methods and available resources of typography can do much to simplify the progress of his book through the press and to make possible a clear presentation of his ideas in printed form.

BOOKS

- BRITISH STANDARD 1219 Authors' and printers' proof corrections British Standards Institution, 1945 pamphlet.
- CHAUNDY, T. W., P. R. BARRETT, and CHARLES BATEY The printing of mathematics: aids for authors and editors, and rules for compositors and readers at the University Press, Oxford Oxford University Press, 1954 illustrations.
- CHICAGO A manual of style containing typographical and other rules for authors and printers and publishers, recommended by the University of Chicago Press, together with specimens of type Chicago: 11th edition, 1949. [One of several exhaustive American compilations of editorial practice.]
- collins, t. howard Authors' and printers' dictionary, a guide for authors, editors, printers, correctors of the press, compositors, and typists Oxford University Press: 10th, re-set, edition, 1956. [An essential reference book.]
- DAY, KENNETH Copy preparation Benn.
- DE VINNE, THEODORE LOW Correct composition: a treatise on spelling, abbreviations, the compounding and division of words, the proper use of figures and numerals, italic and capital letters, notes etc., with observations on punctuation and proof-reading (The practice of typography) New York, 1901.
- HART, HORACE Rules for compositors and readers at the University Press, Oxford Oxford University Press: 36th edition, 1952 16mo. [First published in 1903. Brief, in comparison with CHICAGO above and SKILL IN below, but probably the most influential compilation of its kind.]
- MANUSCRIPTS Preparation of manuscripts and correction of proofs (Cambridge authors' and printers' guides, number 2) Cambridge University Press, 1952 pamphlet.
- SKILLIN, MARJORIE E., and others Words into type: a guide in the preparation of manuscript, for writers, editors, proof-readers and printers New York, 1948.
- See also, after chapter 1, SIMON and UNWIN.

Format

For most books the first specification to be decided will be format. Format is often taken to mean the style and general appearance of a book, as well as its shape and size. It has also a more particular meaning—the cut size of the leaf of paper on which each printed page appears. It is primarily with the size of the leaf that this chapter is concerned.

§3 · SHEET SIZES

The sheet of paper which is fed into the printing press is nearly always big enough to carry a number of pages on each side. When the pages of text have been printed on both sides of the sheet, it is folded, usually several times, until it forms a section or signature with one page on top and the rest hidden beneath, as they will be in the book when it is shut. The area of this page is a half, a quarter, an eighth, or a sixteenth, or a smaller fraction still, of the area of the flat sheet, according to whether each side of the flat sheet contained 2, 4, 8, 16 or more pages.

This being the method of production, printers and bookbinders have established the custom of describing format by stating first the sheet size, and second the proportion between the area of the page and that of the flat sheet.

The British Standards Institution has standardized a considerable number of sheet sizes, and the majority of book formats originate from about a dozen of these, and from unofficial variations on them. The standard sizes in inches are—

foolscap	13½×17	demy	$17\frac{1}{2} \times 22\frac{1}{2}$
post	15 <u>4</u> ×19	medium	18×23
crown	15×20	royal	20×25
large post	$16\frac{1}{2} \times 21$	imperial	22×30

Among the variants used for bookwork are—

small foolscap	large crown	large medium
large foolscap	small demy	small royal
small crown	large demy	large royal

¹ Paper and boards (see page 303).

14 FORMAT

Since these variant sizes are not standard, their dimensions are apt to depend on the typographer who uses them. (It is odd that any size should be described as large demy; unless it is infinitesimally larger than demy, it must in fact be medium or large medium.)

In addition to the standard sizes and their variants, there are one or two rarely used sizes which are not standard; one of these is pot or pott, which has been defined as $12\frac{1}{2} \times 15\frac{1}{2}$.

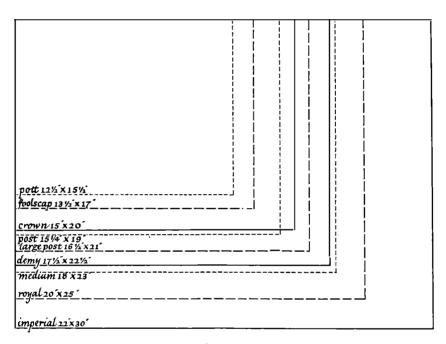


FIGURE 1. The standard sheet sizes, drawn to scale (about one-seventh).

The whole system of named sizes is one of description only. Book formats may be based on almost any size of sheet which can be made, printed and bound; the fact that a sheet size has a name indicates only that it is in common use.

§4 · FOLDED SIZES

After being folded, the section is to be fixed into the book by a thread sewn through the last fold; and the top edge (the head), bottom edge (the tail), and outer free edge (fore-edge) are nearly always cut to make pages of the same size (figure 2).

There are many different ways of folding, and each produces a different

1 Concise Oxford dictionary.

format. The most common method is to begin by dividing the long edge of the full-size sheet (or broadside) into two with a fold; the broadside now becomes two folio leaves. Another fold, at right-angles to the first, produces a section of four leaves, in what is known as a quarto (4to) format; each leaf is one-quarter of the area of the broadside. Successive

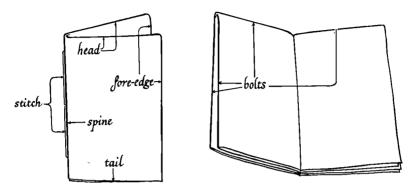


FIGURE 2. The parts of a folded section or signature. Some methods of folding sheets of 16 pages or more also produce closed bolts at the tail.

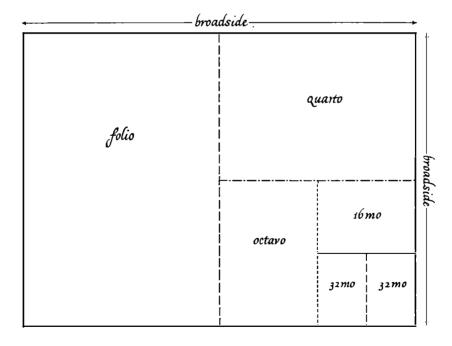


FIGURE 3. The proportion between the uncut page and the basic sheet size. The diagram shows the greater width of the quarto and 16mo page in comparison with the folio and octavo.

16 FORMAT

folds, each at right-angles to its predecessor, can produce octavo (8vo), 16mo, and even 32mo leaves, each in area one-eighth, one-sixteenth, or one-thirty-second part of the broadside. Sizes smaller than 16mo are rare; the great majority of books are produced in octavo formats.

The most common formats are folded in this manner from the five chief paper sizes already mentioned, and are as follows (in inches)—

	broad sid e	folio	quarto	octavo	16mo
foolscap	$13\frac{1}{2} \times 17$	$13\frac{1}{2} \times 8\frac{1}{2}$	$6\frac{3}{4} \times 8\frac{1}{2}$	6}×4 1	$3\frac{3}{8} \times 4\frac{1}{4}$
crown	15×20	15× 10	$7\frac{1}{2}\times$ 10	$7\frac{1}{2}\times 5$	3 ¾ ×5
demy	$17\frac{1}{2} \times 22\frac{1}{2}$	17½×11¼	83×114	8 <u>₹</u> ×5§	$4\frac{3}{8} \times 5\frac{6}{8}$
medium	18×23	18×11½	9×11½	9×5∄	$4\frac{1}{2} \times 5\frac{3}{4}$
royal	20×25	$20 \times 12\frac{1}{2}$	$10 \times 12\frac{1}{2}$	10×6‡	5×6‡

These are the page sizes after folding but before cutting. When the edges of the book have been cut—to separate the pages from each other and to give them a clean, straight edge—the page is rather smaller. About $\frac{1}{8}$ is normally cut off the fore-edge, and the same amount off both head and tail, so that the page is about $\frac{1}{8}$ narrower and $\frac{1}{4}$ less deep than its uncut size.

A different method of folding may be used to obtain pages of different proportions from sheets of the same size. The formats already described result from a succession of folds, each of which reduces the sheet to half its size. If, however, the sheet is so folded that one edge is reduced to one-third of its length before the succession of right-angled folds begins, another range of formats becomes available. The page area here is one-sixth, one-twelfth, or one twenty-fourth of that of the broadside, and the sizes are known as sexto (6to), duodecimo (12mo), and 24mo.

Folds of this kind can be carried out to produce a wide or a narrow page, according to whether the long or the short edge of the sheet is folded into three. The narrower page is known as a narrow 12mo, for example, the wider as a square 12mo.

In the formats described so far, the long edge of the page has been vertical; the book is in fact taller than it is wide, and by analogy with the painter's method these proportions are sometimes called portrait. The same formats can, however, be used for landscape or oblong books, which are wider than they are tall. These may be particularly useful for illustrated books, but are unlikely to supersede the conventional style for general use. The book is awkward to hold, and is less strong and firm than a book sewn along the longer edge.

The named sheet sizes, then, can be made to produce a great variety of formats, large and small, wide and narrow. Printing and binding machinery is built to accommodate sheets of the five principal sizes, or sheets which are multiples of them. Some nine-tenths of British books are designed in formats based on these five. The typographer can, however, have his paper

made in unconventional sizes, so long as he bears in mind the risk of difficulties in paper-making, printing, and binding; for example, special sizes of paper have to be specially made, usually in quantities of a ton or more, and they may not be useful for many books other than that for which they are ordered.

Lack of enterprise in the choice of format may be caused to some extent by the standardization of sheet sizes. It is all too easy to see the problem as one of selection from not more than four or five conventional sizes, and to forget the advantages that odd, or bastard, formats may offer. The best format is that which will best present the book's contents to the reader; if this size has to be modified to suit the printing-press, or the paper-mill, or anyone else, the reader is the loser. A bastard size may be particularly useful, for instance, in the production of an extremely long book. If the type is to be small and close-set in one column, the width of the page cannot be greatly increased, or the line will become far too long for comfort. The depth of the page can, however, be increased to include more lines of the same width. Such a solution may of course be economic only if the paper is to be made specially for the book.

To anyone looking at a closed book, lying on its side in a pile or standing with other books on a shelf, the height of the book is very much more conspicuous than its width. There may be advantages in slight variations of page size among books of a series, and in this case the less conspicuous dimension of the book, its width, may with advantage be modified from the series format.

§5 · MULTIPLE SHEET SIZES

That the form of a manufactured article should be influenced by its function is a principle of book design, as of other kinds of industrial design. That this form is influenced, and may to some extent be determined, by the materials and methods of manufacture is equally true. Format in particular has determined, and is affected by, the capacity of the machine. If industrial book production is to be economical, machinery must be used to the best advantage.

The standard sheet sizes which have already been described are suited to the limited capacity of the hand-press. In this kind of press the paper is placed over the type, and a flat surface descending from above presses the one firmly against the other. The pressure must be even over the whole printing surface, and this entails great rigidity in the press, impossible to maintain over a very large surface without massive construction. For this reason a crown sheet was usually the largest used in the hand-press.

The cylinder press, on which modern book production is based, works

18 FORMAT

on quite a different principle. As with the hand-press, the type lies in the flat bed of the machine; the paper, however, is not pressed flat against it, but is wrapped round a cylinder and rolled across the type, so that only a long and very narrow part of the paper is in contact with the type at any moment.

This makes possible the use of a very much larger sheet—usually a multiple of the standard sheet. Double crown, for instance, is too small for the modern book-printer; quad crown (30×40) is the most common size of sheet; and many book-printers are equipped with eight-crown (double-quad-crown) presses (60×40). The name of a format, however, is derived from the original sheet, not the multiple; a crown octavo page has one-eighth of the area of a crown sheet, and its name is not altered when it is printed on an eight-crown sheet.

§6 · MILL AND PRESS CAPACITY

Paper for bookwork is normally stocked and made in quad and double-quad sizes based on the standard sheets. Within limits paper can be made to any size; but the limits must not be forgotten. Paper is made by pouring a fibrous pulp on to a continuous, moving web of wire, and the most economical width of the sheet is governed by the width of the wire. The pages should wherever possible be printed on the sheet in such a position that the grain of the paper—the direction in which the wire moves—runs up and down the page (§ 185). When an octavo book is printed on a quad sheet, the longer edges of the pages lie parallel with the sides of the printing press. The grain of the paper should therefore run in the same direction; and the longest side of the sheet—which nearly always lies across the printing press—should also lie across the paper-making machine when the paper is being made. If therefore the typographer has set his heart on paper from a certain mill, he must be sure not to use a format which will require a sheet wider than the mill is equipped to produce.

A more important limit is imposed by the capacity of the printing press. Most modern bookwork presses are built to produce books of standard format; but the production of a crown octavo book, for example, may require a sheet rather larger than quad crown (bleeding, § 135). Most quad crown presses are therefore capable of printing a sheet which may be two or three inches in each direction larger than quad crown.

When any unconventional format is planned, the exact capacity of the press on which the book is to be printed should be borne in mind. A successful choice of format is most likely to result from a knowledge of the capacities of the various presses available. One point worth noting is that most double-quad presses can print an eight-crown or slightly larger

sheet, but very few can print an eight-demy sheet. One of the biggest presses in general use for bookwork has the maximum capacity of $45 \times 68\frac{1}{2}$. For this reason, a small demy octavo, $5\frac{1}{2} \times 8\frac{1}{4}$ (cut) will often be a more economical format for long runs than a true demy $(5\frac{1}{2} \times 8\frac{1}{2})$.

§7 · FORMAT AND FUNCTION

The most important factor in the choice of format is the function of the book—how it is to be used and what it is to present. To be read, the book must be held open, or may have to lie open; and when it is not being read, it may be kept standing up on a shelf, or may be carried by the reader.

The format of a book to be used on a church lectern should not be larger than 12×16. A book of these dimensions would not, however, fit the shelves of most private houses, nor could it very well be carried about.

Folio books based on one of the principal sheet sizes are apt to be inconvenient both in and out of use. They are too big to hold on the knee; when they are laid open on the table, the head of the page is uncomfortably distant from the eyes of a reader seated at the table; and they are likely to be too big to carry about with ease.

Quartos are more manageable. Except in the smallest size, they are rather too big to be conveniently portable, but only the largest will fail to fit into shelves which are one foot apart vertically. Up to about crown quarto they can be held comfortably on the knee.

Octavo formats are by far the most popular. All except the very largest can be held on the knee; below about royal octavo they can be carried quite easily. Most octavos will fit into ordinary shelves. Crown octavos and below are particularly useful formats for books which are likely to be carried, and which may have to be read in the hand.

For holding and carrying, 12mos, 16mos, 24mos, and 32mos are, of course, the best formats, and they are chiefly used for religious books which are to be taken to church and used there. The production of such little books was one of the glories of the typography of the past, but the reader of today requires a larger type than can be accommodated on the narrow pages of sizes below demy 16mo. The larger 16mos may be found useful as a rather squarer alternative to the smaller 8vos; an imperial 16mo page, for instance, is the same height as a crown 8vo, but is ½" wider.

Sextos are either too wide or too narrow to be much used for bookwork, and there are difficulties in folding such formats which cause printers and binders to dislike them. Duodecimos are awkward to fold, but for certain purposes a narrow 12mo may be found so apt as to be well worth using (§ 8). In area the narrow 12mo page is between the octavo and the 16mo, and in its proportions it is a good deal narrower than either.

SONG

Sweetest love, I do not goe,
For wearinesse of thee,
Nor in hope the world can show
A fitter Love for mee;
But since that I
Must dye at last, 'tis best,
To use my self e in jest
Thus by fain'd deaths to dye;

Yesternight the Sunne went hence,
And yet is here to day,
He hath no desire nor sense,
Nor halfe so short a way:
Then feare not mee,
But beleeve that I shall make
Speedier journeyes, since I take
More wings and spurres than hee.

O how feeble is mans power,
That if good fortune fall,
Cannot adde another houre,
Nor a lost houre recall!
But come bad chance,
And wee joyne to'it our strength,
And wee teach it art and length,
It selfe o'r us to'advance.

When thou sigh'st, thou sigh'st not winde,
But sigh'st my soule away,
When thou weep'st, unkindly kinde,
My lifes blood doth decay.
It cannot bee
That thou lov'st mee, as thou say'st,
If in thine my life thou waste,
That art the best of mee.

The proportions of the standard sheet sizes are for the most part 3 to 4, 4 to 5, or between (figure 1, § 3); post, a particularly square size, is an exception. Most folio, octavo, and 32mo pages based on standard sheets therefore have the proportions 6 to 4, 6 to $3\frac{3}{4}$, or between; quarto formats are substantially squarer, their proportions being in the neighbourhood of 6 to $4\frac{1}{2}$ and 6 to $4\frac{4}{5}$.

§8 · CONTENTS AND FORMAT

The contents of the book must be allowed to influence the choice of format. If the length of the typescript is already known, the typographer can, after choosing the format, make a rough estimate of the number of words on the page and so of the number of pages in the book. If there are likely to be too many pages or too few, the size of the page may have to be increased or reduced.

If illustrations are to be one of the main features of the book, a large format may be necessary in order to display them adequately.

One of the problems which can be solved by a good understanding of format is the economical printing of verse—a form of literature which nearly always needs economy in production. Much English verse is composed in iambic pentameters—ten syllables—or in shorter lines, and the setting therefore tends to be narrower than that of most prose, for which ten *words* is usually considered a suitable length of line. If a common format such as crown octavo is used, 64 pages $5 \times 7\frac{1}{2}$ (uncut) can be printed on a 30×40 sheet. The press which many printers would use for this sheet can print a sheet up to $33\frac{1}{2} \times 45$; if a sheet occupying the full capacity of this machine were used instead of 30×40 , it could be folded narrow 12mo to give 96 pages $4\frac{3}{16} \times 7\frac{1}{2}$, also uncut. The sheet is one-fifth as large again as the quad crown sheet, but produces half as many pages again—pages of the same depth, and it is depth that is needed rather than width (figure 4).

The extra width of quarto pages makes them particularly suitable for text set in double column. A particularly long work of fiction, for instance, might be produced in a two-column setting with small type in foolscap quarto. This format is slightly less tall than demy octavo and is substantially wider. The extra width of a quarto, on the other hand, invites rather too long a line of text in single-column setting, unless the type is large.

FIGURE 4 (opposite). From a book of verse, designed by Jan Van Krimpen, set in Romulus, and printed on a narrow page similar to a narrow 16mo: reprinted from an electro. The titlepage of this book is reprinted at figure 28, § 100.

22 FORMAT

§9 · FORMAT AND CONVENTION I

There are certain conventions about format which, like other conventions in book design, should be observed if there is no good reason for disregarding them. The conventions are neither many nor rigid, but deserve attention because booksellers, librarians, and the book-buying public tend to hesitate before buying a book of unusual shape. The great majority of books are produced in octavo formats; quarto formats are generally used only when there are many pictures to be reproduced in large sizes. The most popular sizes are foolscap octavo, crown octavo (with large and small crown octavo), demy, medium and royal octavo, and crown quarto. Most fiction is crown octavo, though small octavo is popular for paper-bound fiction. Demy octavo is suitable for a book on almost any subject.

§ 10 · THE LOOK OF THE THING

Aesthetic factors in book production are difficult to pin down for examination and description. Efficiency in the presentation of its contents, economy in manufacture, and durability in use and store are the prime physical virtues of a book, but to attract and please is as important for a book as for an orator. Taste as well as reason must attend the choice of format. Some typographers like their books a little narrower than usual, others prefer them squarer; there are even those who have the temerity to assert that one proportion of width to height is aesthetically correct and that all others are wrong. As a rule, formats are usually between 4 to 3 and 7 to 4 in their proportion. On the whole, leading designers who wish to produce a particularly attractive book seem to favour a slight narrowing of format from the standard proportions of octavo books.² Utility and aesthetics are closely linked, and this preference for a narrow page may be caused by the advantages of a narrow measure (§ 78).

Some of the principles which govern the choice of format have been mentioned in this chapter—the nature of the contents, the capacity of various kinds of machinery, conventional preferences, and so on—but no one stage in book production can in practice be isolated from the others. The choice of format affects, and is affected by, several other factors such as margins, width of line, type size and illustration area, which are discussed in succeeding chapters. The first step is unlikely to be a forward one unless the general direction of the journey is known.

¹ See also appendix A.

² As, for instance, in the Library Editions of the Nonesuch Press and in Penguin Books. See also figure 4, § 8.

Margins

Having determined the size of his page, the typographer must decide how much of its area is to be given up to the text. An easy approach to this decision is to calculate how much of the page is to be kept unprinted, as margins surrounding the printed area.

§11 · MINIMUM MARGINS

Margins are usually understood to be the space round the main text on each page. The page number, if it appears alone at the foot of the page, occupies too little space to be accounted part of the main text, and may be printed in the lower margin. The headline, on the other hand, which often appears on every page of text except the first of a chapter, usually consists of more than a word or two, and may reasonably be treated more or less as though it were a part of the main text.

To print a page without margins would hardly be practicable. If the text were to run right up to the sewn edge of the page, part of it would disappear into the bend in the paper caused by backing—the bending outwards of the backs of all the sections to form a hinge for the boards (§ 196). Text running up to any cut edge would be in danger of being cut away if the binder were to make even the slightest mistake in cutting.

Many books, particularly those used by libraries, are re-bound, sometimes more than once. This involves cutting the edges again, and each cut may take off $\frac{1}{8}$ ". The very narrowest margin used in most books (since a good proportion of any edition of most books either finds its way into libraries or is intended by their publishers to do so) should be $\frac{3}{8}$ " from cut edges (so that after two rebindings the edge will still be $\frac{1}{8}$ " short of the text) and $\frac{1}{4}$ " from the sewn edge (about $\frac{1}{8}$ " may be taken up in backing, and the text will still be $\frac{1}{8}$ " short of the bend in the page). For the same reasons, neither the page number nor any other printed matter which is essential to the book should be vulnerably close to any edge.

§12 · WIDE MARGINS

To suggest a minimum size for margins is easier than to decide how wide the margins should be.

People who are in favour of ample margins put forward a variety of

24 MARGINS

reasons for their preference. Margins are said to provide a frame of white round the text which separates it from the scenery beyond the open book. This frame, like that of a picture, enhances by contrast the appearance of the area it surrounds, and emphasizes the correctness of its placing on the page. Another reason, rather more practical, is that margins provide room for the fingers and thumbs of the reader. For one reason and another, ample margins are considered to be a fundamental of fine printing, and the hey-day of the private press movement, now in decline, filled the bookshelves of collectors with large areas of costly deckle-edged paper, much more than half of which was unprinted because it formed the margins.

To find proof of the value of wide margins is less easy than to assert it. If they are not too wide, wide margins may enhance the appearance of the book; but the function of a book is not to be admired but to be read. Wide margins may be pleasing; they are certainly uneconomical, and the help they give to the act of reading is open to doubt. Unless the typographer is confident of the practical value of wide margins in industrially made books, he will probably decide that there is nothing admirable in them, and will as a rule prefer not to exceed by any great extent margins consistent with the custom of the day.

The point about fingers and thumbs is a doubtful one. A well-produced book should not need to be held open; the text area does not suffer from being handled unless the hands are dirty, and few readers, other than young children, are clumsy enough to be consciously impeded by their own fingers.

Although there may be no intrinsic value in wide margins, in certain circumstances they may be useful. A very short typescript, for instance, may be produced as a reasonably thick book if the type area is reduced and the margins increased. To use a smaller format with ordinary margins might be more economical, but particularly small formats are at present rather out of fashion.

A book which contains many small illustrations may benefit from margins which are roomy enough to accommodate them (figure 6, § 14). The fore-edge and tail margins, which are usually the largest, may be used in this way with success. Few modern books are so written as to require printed notes *beside* the text, but the fore-edge margin, if wide enough, may well be used for them, and even perhaps for headings.

To write on the text pages of a book is apt to be considered a pernicious habit, particularly by those who design the pages. Scribbling is an annoyance to later readers of the same book, particularly if it is intended for the use of the public. But a book is made to serve its owner; and those who use certain kinds of textbook may benefit from unusually wide margins at foreedge and tail, which leave room for the student's written notes.

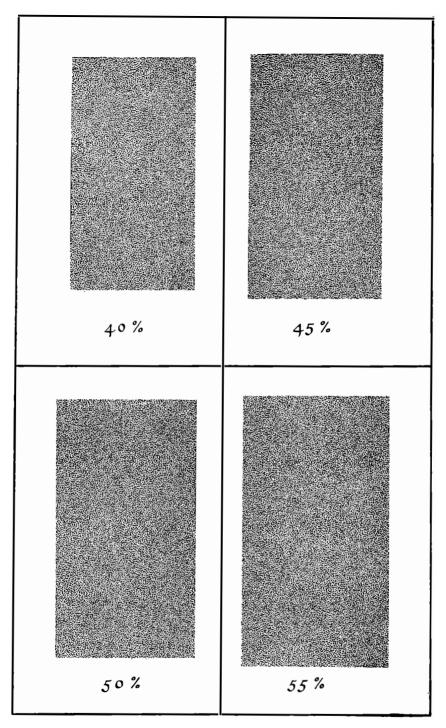


FIGURE 5. This represents four pages with differing type areas: the percentages relate each type area to the area of the page. The text of a lavishly produced book may reasonably occupy even less than 40 % of the page: that of a cheap edition, substantially more than 55 %.

26 MARGINS

To rely on formulae when deciding margins (or at any other stage) would be unwise; the conditions of book production are too varied for set rules. Margins which are at present considered suitable for the general run of books occupy about 40 to 45 per cent. of the area of the page. Certainly there does seem to be something incongruous in allotting to margins more than half the page area of a book which is made by means supposed to be economical.

A text setting in which there is plenty of space between the lines seems to need smaller margins than one in which the lines are set close together. The use of a light type-face, the letters of which are constructed of slender strokes, seems in the same way to suit rather narrower margins. It is as though plenty of paper showing through the text area compensates for any lack of paper around and outside it.

§13 · PROPORTIONS

Except when margins are so narrow as to be negligible, their proportions to each other are not less important than their width. The most common arrangement is to place the rectangle of text rather high on the page and near the sewn edge. The back margin is therefore the smallest; the head, slightly larger; the fore-edge, wider still; and the tail, largest of all.

This is because on opening a book the reader sees not one page but two—a left and a right, or, in printing terms, a verso and a recto—together described as an opening, and usually treated as a single item for purposes of design. The back margins of the two pages are seen as one channel of white; if this channel appears to be wider than each fore-edge margin to left or right, the rectangles of text will apparently lie rather too near the outer edges of the pages. The back margin of each page should therefore appear to be half the width of the fore-edge margin, or very little more.

If the book is to be backed in the usual way, about $\frac{1}{8}$ " of the sewn edge of each page will be bent out of sight, or nearly so, and this amount must be subtracted from the width of the page before the margins are worked out.

If a rectangle of text is placed midway between the head and tail of a page, the eyes for some reason suggest to the brain that the text is just a little nearer the tail—in fact, that it tends to 'fall out of the page'. To avoid this, the tail margin is generally larger than the head.

The exact proportions that the four margins should have to each other are a matter of opinion. One popular formula for the ratio back-head-fore-edge-tail is $1\frac{1}{2}$ -2-3-4. This may be used as a guide; but where margins are narrow it may entail rather too little space in the back margin, particularly if the book is a thick one and the pages curve steeply down into the back of the binding when it is opened.

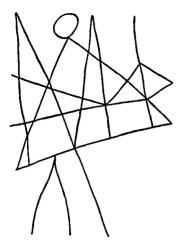
§14 · MARGINS AND CONVENTION

Margins of conventional width and proportions are not invariably the best even for books designed in a conventional style. The doctrine of drawing the two pages together and upward in the opening has been so generally praised by people concerned with printing that it has accumulated the strength of a law. Reliance on conventions or laws in typography is apt to result in the disregard of problems which could be solved by the use of a little common sense. This particular example of dogma is derived indirectly from the ancient traditions of printing, and directly from William Morris, who earned his fame by rebellion against the standards of his day, and who himself defied convention to the extent of printing the title-page on the left of the opening.

The width of margins, if greater than the minimum, and their relative proportions, are a matter of pattern rather than of function; most of the practical uses assigned to margins appear to have been invented to excuse a feature whose purpose is aesthetic, and one writer has even gone so far as to assert that well-proportioned margins can redeem badly composed text. The prime function of wide and accurately proportioned margins is to cause admiration; this may be a good thing to attempt, but the efficiency of the book in presenting its contents, and its economy in production, must be attempted first. Pattern, in fact, must be subordinated to function; and function and convention cannot always be reconciled.

This is recognized quite often in practice. Cheap books are sometimes bound with a side-stitch, which passes through every page at about \(\frac{1}{6}'' \) or more from what is usually the sewn edge. Fortunately this is rare, for it prevents the book from opening properly; in order to minimize the inconvenience of the opening, the printer makes the back margin of the page the widest. It would be equally reasonable, when planning a thick book which will be stiffly bound, to move the text area outwards from the sewn edge, so that it will not curve downwards into the deep channel of the back when the book lies open.

The most generally admitted purpose of conventional margins is to enhance the appearance of the opening by making a unity of it. This may be reasonable if the opening is in fact a unity, but there may be cause to dissociate two facing pages. An illustration may be related to a whole chapter, for example, or to some page other than that which faces it; or perhaps poems on facing pages should be considered separately rather than in relation to each other. Typographers of the avant garde have shown that if the margins are extremely wide, and if the panel of text is pleasantly shaped (being tall and narrow rather than square), the proportions of the margins can be quite different from those laid down by convention—the



sérénité. d'ai conservé intacts les souvenirs de ce séjour émouvant tant par les circonslances traglques qui nous réunissalent que par ces échanges qui devalent hélas être bientôt Interrompus pour toujours. Après Nérac je n'ai revu Sophle qu'une seule fois avant sa morl, lors d'un séjour clandestin qu'elle fil à Paris en 1942.

Mes amis Arp avaient Irouvé un refuge à Grasse, et maloré les mauvaises conditions d'existence lle v avalent réorganisé leur vle de travail. De nombreux dessins el gouaches de Sonhie laissent l'impression d'un état d'esprit de plus en plus libéré des conventions. On y trouve aussi plus d'abandon et de sensibililé avouée. Ils avaient retrouvé d'autros amis, refugiés comme eux dans ce coin de France encore prolégé contre l'inquisilion de la Gestano: le peintre Magnelli e I Sonia Oelaunay. Ils se réunissaient souvent et, en quiso do distraction. se IIvralent à des jeux picturaux (si j'ose dire), l'un commencant un tableau que à tour de rôle les autres continualent à leur fantaisie. Il est sort de cotle collaboration inédile quelques spécimens forl remarquables.

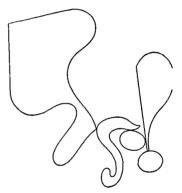
La modeslie de Sophie Arp fait qu'on s'étonne de retrouver chez elle après sa mort outre les toiles retenues par cles collectionneurs ou des musées une œuvre aussi complète, aussi solide, et dont l'ensemble (plus de 600 toiles, gouaches, dessins, rellefs) apparail avec le recul du temps comme une unique construction architecturale dont lous les détails confirment l'unilé. La série des gouaches les plus anciennes se ratlache logiquement à celle des derniers dessins de Grasse. On y retrouvo la même sensibililé retenue par son besoin d'ordre et d'équilibre qui parfois m'apparaît Irop exigeant dens les époques Intermédiaires. Ces dernières pelntures surtout se libèrent, s'élargissenl, s'épanoulssent. Les motifs, écheveaux do serpentins enchevétrés, sans commencement ni fin, ou bâtonnets juxtaposés que des l'ils télégraphiques relient à des étoiles, sont jalonnés d'éclats de couleurs vivos. Elles suggèrent la Joie, l'espace. Elles sont légères et souples, précises et sures. Meis toujours le purelé des lignes, le dépouillement des arlifices émouvent comme le chant d'une volx isolée parfailement pure et juste.

Je cite, pour terminer cette tentative très imparfeite d'une évocalion de la personnalité exceptionnelle de Sophie Tæuber-Arp, quelques lignes que m'avalt Inspirées l'une de mes visites à Meudon et qui expriment encore fidèlement le souvenir que j'al conservé d'elle:

Je ne puls la séparer du bcau Mythe d'Istar. Istar s'élève par degré vers le soloil, son amant, laissant tomber à chaque élape l'un des voiles qui la dissimulent, et alleint le sommet complèlement dépouillée, vêtue de sa seule perfection.

Ainsi chacune des œuvres de Sophle Arp est une sorte de dépouillement de tout ce qui peut être vain, inutille, facile et flatteur aux sens. Elle adopte quelques formes extrêmement simples: le rond parfait, le losange plus ou moins régulier. Elle s'accorde à pelne quelque diflérenciation de couleur. L'abstrait est une nécessité de son intelligence et de sa sensibilité, et le point où se matérialise par elle l'expression artistique dont la résonance humaine, presque impossible à salsir et encore plus à définir, se mesure avec desrègles infinitésimales. – Un centimêtre de plus ou de moins et voilà rompu l'équilibre dont elle poursuit la matérialisation.

Qu'elle me pardonne de rapprocher ses œuvres d'un speclacle de Jonglerie entrevu autrefois dans quelque Music-Hall de New York. Le iongleur jouait avec des boules blanches auxquelles se mélengealent quelques boules rouges. Elles l'entouralent d'un réseeu mouvant dont il alimentait la course d'un effort presque imperceptible. Seules les mains dénonçaient une activité. Les épaules tombantes étalent placides et strictement Immobiles. Le regard vague, perdu dans quelque conlemplation intérieure, semblait suivre la trace du rythme musical de l'orchestre à peine distinct et pourlant impérieux, comme seuls les purs jazz nègres en ont le secret. Parfois la musique s'enflalt comme pour atleindre un lemps plus long, nettement détaché alors de l'engrenage rythmé. Merveilleusement les boules sulvaient les méand res du son - elles montalent, montalent, et au point précis de l'accent sonore c'est l'une des boules rouges qui en marquait l'Irrégularité et l'intensité. Cette précision, cette habileté touchaient à une perfecllon subtile, impondérable, ml-son ore, ml-oplique, Impossible à situer. Sur quelle dimension joualtelle? - J'al souvent pensé que la perfection cherchée par Sophle Arp, hors de toute forme humaine, ce jeu eubili de ses ronds qu'elle appelle plaisam-



30 MARGINS

page is not in any way difficult to read, and those who can overcome their initial aversion may find the effect admirable (figure 6). Margins of this kind, however, rely partly on disproportionate width for their success, and are unlikely to be economically possible in ordinary industrial book production.

The modern typographer, then, will do well to rely on his common sense and his eye rather than on the practice of his predecessors, both when choosing margins and at other stages in the preparation of a design.

Text composition

Success in book design depends almost entirely on success in the design of the text page. The most admirable solution of all other problems can do nothing whatever to redeem a failure here. Text design is the foundation of the typographer's craft, and can be the pinnacle of his achievement. Reputations may be made elsewhere; it is here that the reader and the author can be served.

One text page of any book is usually very much like another, and most books contain scores or hundreds of them. As though coaching a friend for a public speech, the typographer must make sure that the book, which is to address the reader at length, does so without either monotony or distracting gestures. Its manner must be persuasive enough both to attract and to retain the attention of those who glance into the pages to see whether they wish to read or buy. Nothing can redeem inferior composition and printing in text pages, or confound text pages which are good.

Such pages can be achieved only with the aid of a clear understanding of the technical principles of composition. This technique comprises so many difficulties, subtleties, and possibilities that those who do not comprehend it will do well to leave its planning to the printer, who does. A little knowledge is just enough to design a really bad page.

The technique of and equipment for text composition, then, are discussed briefly in this chapter and in the three which follow it.

§15 · TYPE-FOUNDING

The principles of type-founding have changed very little in 500 years. A letter, reversed from left to right, is cut in relief at the end of a steel rod; this is called a punch. The punch is struck into a small slab of bronze alloy, a softer metal, so reproducing the engraved letter, recessed, and facing the right way round; after further processing, this becomes the die or matrix, many of which can be struck from the same punch. A softer metal still—an alloy of lead, tempered with tin and antimony to give the cast sharpness and endurance—is melted and poured into the mould to which the matrix is fitted. When the metal cools and solidifies, it

reproduces from the matrix the letter cut on the punch, and from the mould the shank or body which supports the letter; this metal cast is a type. The printing surface at the top may be a punctuation mark, a figure, or some other character as well as a letter. Type is rectangular in section and in plan, and in Britain is nearly always 0.918" high.¹

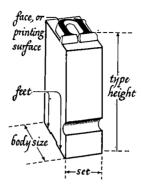


FIGURE 7. Some of the more important parts of a type.

When in use, the type stands on its plain end (the feet), with the printing surface upwards. Type-height is rarely important to the designer, and the dimensions of type mentioned in the rest of this book refer to the body or printing surface as seen from above.

§16 · MEASUREMENT

The width of the body of a type, measured across the letter, is its set; its depth, measured up and down, is its body. The bodies of types cast to modern specifications are nearly always described in points, the printer's fundamental unit of measurement. A point is almost exactly one seventy-second of an inch (0.01383"). Before the general adoption of the point system, bodies were all approximate, and were known by traditional names such as long primer and brevier, deriving from their use. The body which approximated to 12 points, for instance, was known as pica, because type of this size was used for composing the Pica, a book in which the procedure for certain movable feasts was described.

Traditionally used to indicate an approximate body, the term pica has survived to be used as an exact unit of measurement. As 12 points it is almost exactly one-sixth of an inch, and is used to express typographic measurements across and down the page. The traditional names for other bodies, such as nonpareil for approximately 6-point and bourgeois for 9, also appear from time to time.

¹ The University Press, Oxford, retains its old type-height of 0.9395.

Spaces, such as those which separate words or blank out a short line at the end of a paragraph, are cast on a body of the same size as the types with which they are used, but are lower than type-high, so that they will not print. They are cast in various widths. A space cast in a width equal to its body size is known as an em quad or mutton quad; a space half as wide as its depth is an en quad or nut quad. 'Quad' is short for quadrat.

Ens and ems are also used as units of measurement for the width of the text, and their width naturally depends on the body of the type with which they are set. If ems are mentioned as units of measurement without explicit or implicit reference to any particular type body, they are assumed to be 12-point ems.

The term 'en' is also applied to the average width of characters, since the alphabet of twenty-six letters is usually more or less equal in width to 26 ens, and the average word-space may be taken as equal to an en. The en is therefore useful for comparing the typescript with the printed page. Anything which requires a stroke of the key or space-bar of the author's typewriter may be described as an en.

The width of the setting is known as the measure, whether or not all the lines fill the measure. It is described in picas; the depth of the page setting is described in lines, the body being stated and the extra items, such as the headlines, being separately mentioned.

The various dimensions of the letters are important in type-design. It is essential to remember that set and body refer to the shank of the type, and not to the letter itself. Letters occupy nearly the whole width of their shank, but few occupy anything like the whole depth. Short letters such as a and z occupy only about one-third of their body, which is deep enough to accommodate both ascending and descending letters such as I and y.

The fitting of a letter is the space between the left- and right-hand edges of the printing surface and the edges of the shank. Fitting, which governs the amount of space between letters, becomes important when the letters are composed into words.

The line, or the main line, is an imaginary line passing through the lowest part of the majority of printed letters, which do not have descending strokes, as do g j p q and y, for instance. The distance between the line and the lower edge of the body (the front) is the beard. The line and the beard are referred to when the vertical alignment of letters has to be considered.

The x-height of an alphabet is the height of the letter x. In order to achieve apparent evenness of size, letters with curved or pointed tops or bottoms are designed slightly deeper than others, and o, for instance, is slightly taller than x as a rule.

¹ LEGROS and GRANT: Typographical printing surfaces, page 14.

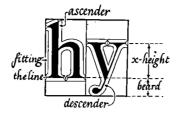
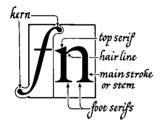


FIGURE 8. An ascending and a descending letter, showing some of the parts and dimensions of the face. In type, the letters would of course be reversed from left to right.

§17 · LETTER DESIGN

All letters now used for printing are derived, however indirectly, from letters evolved in writing. The writing-tool of the Middle Ages, when typography was invented in Europe, was the square-ended pen, which imparted to the written letter characteristics still surviving in cast type.

One of these is stress, or shading. The natural angle of a pen held in the hand for writing is towards the diagonal to the page. When the pen was square-ended the thickest part of the stroke of each letter was that which inclined diagonally across the page, towards the right elbow; the thinnest part was at right angles to the thickest, and at intermediate angles the stroke increased gradually from thin to thick and back again. The angle of stress or shading, then, is the direction of the thickest part of the curved strokes; in roman types it varies between the diagonal (oblique shading), from left down to right, and the vertical.



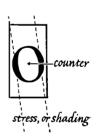


FIGURE 9. Some of the parts of the letter. Above left, details referred to in subsequent chapters. Above right, oblique stress (though in a face having oblique stress, O is often drawn with vertical stress). Below, the three most common kinds of serif.







Another characteristic derived from the pen is the serif, the small terminal stroke which appears at one end or both ends of the main stroke of a letter. Serifs may be divided into two classes; the top serif appears at the top of a vertical stroke, and may be either horizontal or diagonal; the foot serif, at the foot of the vertical stroke, is usually horizontal. Serifs are of various kinds, and may for instance be bracketed or unbracketed, slab or hair-line, horizontal or oblique.

The hair-line of a letter is its thinnest part, other than the serif, whether or not it is particularly thin. The mainstroke or stem is the thicker stroke of a letter which contains strokes of more than one thickness; or a letter which has one stroke only consists usually of mainstroke and serifs. The kern is any part of a letter which overhangs the shank; few roman letters, other than f, need kerns, but several italic letters have them, and f usually has two. The counter is the space wholly or mainly enclosed by the strokes of the letter.

§18 ⋅ SPACES AND LEADS

Words are always separated from each other by spaces. Various thicknesses of space are usually available for hand composition, all related in set to the em quad. From 6 to 11-point, the spaces may be 6, 5, 4, 3, and 2 to the em (hair, thin, middle, thick, and en spaces); from 12 to 24-point, 9, 8, 7, and 6 (hair-spaces), 5, 4, 3, and 2 to the em. The hair-space by itself is rather too narrow to be used alone for word-spacing. Intermediate spaces can be made by combining two or more spaces together.

In addition to these proportionate spaces, most founts have spaces of I point, which are used singly or in groups between letters rather than between words. Roman capitals are so designed that some of the letters appear to have space on one side or both; in certain combinations, the letters seem to have spaces between them. Eleven of the letters occupy most of the width of their shank; eleven more appear to have a little space at one side or both, because of curvature or irregularity of outline; and four have a conspicuous space on one or two sides. Each of these three groups, then, although set without spaces between the letters, appears to be spaced differently. In order to give the setting an appearance of regularity, spaces are needed between the letters, their thickness varying when possible according to the space inherent in the neighbouring letters. This is often done not only in headings but also in the text. Small letters, on the other hand, derived from letters which in origin were a rapid and cursive version of capitals, and now used for sustained reading, need no letter-spacing, and except in very large sizes appear to combine best when set closely together laterally.

BEFHIMNSUZ DCGJKOPQRTXY ALVW

Monotype Baskerville capitals; above, set solid: below, letter-spaced.

BEFHIMNSUZ DCGJKOPQRTXY ALVW

The space between the lines of text can be increased from the minimum by the insertion of strips of lead alloy known as leads. Leads are of various thicknesses; the hair lead, for instance, is 1 point, the eight-lead (because there are eight to the pica) $1\frac{1}{2}$ points, the thin lead 2 points, the thick lead 3 points, and there are other sizes up to 12 points. In mechanical text composition, the use of leads is often avoided by casting the type on a body larger by the amount of extra interlinear space required.

§19 · LETTER NOMENCLATURE

The letters in which these words are composed, and which are used for nearly all text setting in English-speaking and many other countries, are known as roman, from their origin. The slanting letter which is used for emphasis and other special purposes is a medieval development of the roman letter and is known as italic. Another kind of letter, which sometimes replaces italic, has only its slant in common with it; in other respects it is a roman, or a mainly roman, letter, and is usually known as a sloped roman.

Roman and italic both have capital letters, or majuscules, known to the printer as caps or upper-case, and small letters or minuscules, known as lower-case. The reference to 'cases' derives from the arrangement of cases from which type is set by hand. Nearly all roman founts for text composition include small capitals, which are similar in x-height to the lower-case letters. Being intended for occasional use with the lower-case letters, they

are usually designed with strokes of similar thickness, and therefore tend to be rather heavier in proportion to their height than ordinary capitals; in order to maintain the size of their counters, they are often drawn rather wider in proportion too. Text is normally set in roman lower-case.

VAN DIJCK Van dijck

FIGURE 10. The capitals of 14-point Van Dijck (above) and the small capitals (below), enlarged photographically to the same height, to show differences in width and in thickness of stroke.

sprinkled with capitals and sometimes with small capitals and italic; because of the predominance in use of the roman lower-case letter, its proportions require more study than those of other letters.

Of the twenty-six roman lower-case letters, thirteen may be known as short letters. These are a c e m n o r s u v w x and z; measured vertically, they are the smallest. i and t may also be described as short letters, since they are only slightly taller, one by a dot, and the other by a short finishing stroke. Eight other letters—b d h k and g p q y—have main bodies the height of which is similar to that of the short letters, but they also have verticals which rise or fall from the main part of the letter. These strokes are known as ascenders or descenders, and may be grouped under the names extenders or extruders. Twenty-three out of twenty-six letters, then, possess main bodies of even height and varying width, some with ascenders or descenders, most without; since these letters predominate in text composition, their x-height—the height of the main body—is particularly important. The remaining three letters of the alphabet—j l and f—consist principally of vertical strokes.

To the printer, an alphabet is a set of types of one particular kind, such as roman lower-case or italic capitals of a certain design and body. A fount is usually made up of a set of alphabets of one size and based on one design (p. 38), but may consist of one alphabet only, if no more alphabets of that design exist in the same size. As a rule, a fount comprises upper and lower-case roman, small capitals, and upper and lower-case italic; and in addition to these alphabets, punctuation marks, figures, ligatures, accents, reference marks, and sometimes other characters.

Figures are of various kinds: modern, or lining, figures are all the same

1 D. B. UPDIKE: Printing types, page 18.

height, and often range with capitals; old style, old face, or hanging figures range approximately with the lower-case letters and like them have extenders. Most text founts include both upright and inclined figures to sort with roman and italic types. These are often referred to as roman and italic numerals; but roman numerals are in fact those composed of letters, and no inclined numerals were used in the days of the genesis of italic writing.

roman lining figures (Imprint) 1234567890
roman hanging figures (Imprint) 1234567890
italic lining figures (Bell) 1234567890
italic hanging figures (Bembo) 1234567890
superior figures 1234567890
inferior figures 1234567880

Six kinds of numeral.

Superior and inferior figures are much smaller than the other characters, and are ranged near the top of the body or across the main line. Ligatures, necessitated by the tendency of some letters to fit badly side by side, are groups of letters whose design is such that they are joined to each other, and are cast on a single shank; the five ligatures usual in a roman fount are fi ff ffi ffl and fl. Accents are usually understood by the printer to comprise not only the accent itself but the letter which it qualifies; thus $\grave{a} \, \acute{e} \, \acute{o} \, \ddot{u}$ and \emph{c} are all known as accents. The conventional reference marks

¹ Characters of this kind have various names in the printing trade. Two of the most pleasant terms are 'arbitraries' and 'peculiars'.

are used to connect a textual reference to the appropriate note, and in order of occurrence are the asterisk *, dagger †, double dagger ‡, section mark \S , parallel mark $\|$, and paragraph mark \P . Most punctuation marks can be used with either roman or italic, but many founts include italic :, ; ! and ?, and some include () and []. A few founts, usually those designed with abbreviated extenders, can be equipped with special long descenders, and sometimes with long ascenders as well (figure 20, \S 90).

Some founts contain swash letters; these are decorative in form, and may be either capital or lower-case. They are intended for ornament rather than legibility, and are not often used in text composition (§ 46). Special sorts are special characters, such as ø and ŋ, not normally required for English composition.

A series is a set of founts related to each other in design, but graded in size. If only one alphabet has been cut to a certain design, that alphabet itself may in theory comprise a series. Most text series are made up of anything from two to fifteen or twenty founts. The most common text founts are 6, 8, 9, 10, 11, 12, and 14-point; rarer sizes include 4\frac{1}{4}, 5, 7, and 13-point. Larger sizes such as 16, 18, and 24-point may also be used for text setting by machine, and some text series include 20 and 22-point founts. The most frequently available display founts are 14, 18, 24, 30, 36, 48, 60, and 72-point; 16, 20, 22, 40, 42, and 44-point are less common. Display type is usually understood to be that of 14-point body or larger, unless, in the Monotype range, the matrices are made for the composition caster.

A family is a group of series which are related in design. It may consist

Times Bold (334)

Times New Roman (327)

TIMES HEVER TITLING (355)

TIMES BOLD TITLING NUMBER 2 (328)

TIMES BOLD TITLING (332)

TIMES EXTENDED TITLING (339)

TIMES TITLING (329)

Times New Roman Book (627)

Monotype Times New Roman and its family, with series numbers.

2-point 60-point type 48-point Caslon 42-point Caslon type 36-point Monotype face 30-point Monotype Caslon 24-point Monotype Caslon type 20-point Monotype Caslon type-face

The 18-point Monotype Caslon type-face

The 14-point Monotype Caslon type-face (series 128)

The 12-point Monotype Caslon type-face (series number 128)

11-point Monotype Caslon (series 128)

10-point Monotype Caslon (series 128)

9-point Monotype Caslon (series 128)

8-point Monotype Caslon (series 128)

7-point Monotype Imprint (series 101)

6-point Monotype Imprint (series 101)

Examples of type sizes from 6 to 72-point. The two smallest sizes only are Imprint; the rest are Caslon.

for instance of light, medium, and heavy, or wide and narrow, versions of the same letters. Some series have variants which are so designed that the parent series and its variant can be used together. The most common of these is the mated bold, which aligns with the letters of the main series and has the same x-height, but which is built of thicker strokes. There are also other variants such as a few bold italics and semi-bolds, light versions of the standard roman, and condensed (or narrow) and extended (or wide) versions of the roman and of the bold.

§20 · COMPOSITION METHODS

Type is set in a composing-stick, a small oblong tray with one long side open, and with one end which can be adjusted in distance from the other. The internal distance from end to end is the measure.

From the case or cases before him, the hand compositor takes letter after letter in due order to form a word, and places them in the composing-stick, which he is holding in his left hand. At the end of each word he places a space before beginning the next word. When the line of characters comes so near the farther end of the stick that there will be no room for another word, or even perhaps for the rest of the word he has already begun, he increases or decreases one after another of the word-spaces until the line exactly fills the measure. This last process is known as justification. If the line is not filled with words—the last line of a paragraph for instance may contain only two or three—it is filled out with spaces which are justified; the spacing between the words needs no adjustment.

When the composing-stick is full, the lines of type are transferred to a long tray called a galley; this contains the equivalent of some three octavo pages. The type on the galley is printed on to a long slip of paper; this is a slip or galley proof—all prints taken for verification of the setting are proofs or pulls. When the proofs have been read and corrections marked on them, the corrections are carried out and the solid block of type is divided into pages, usually still on the galley, by the insertion between appropriate lines of extra spacing material, headlines, page numbers, and so on. Proofs taken from the paged text are slip or galley pages.

After these have been corrected, the pages of type are taken out of the galley, arranged in a rectangular formation (imposed—§ 135) governed by the manner in which the printed sheet is to be folded (§ 190), surrounded by strips of wood and metal (furniture), and fixed tightly (locked up) in a rectangular metal frame (a chase) with wedges or quoins of wood or metal. Chase bars are the internal struts by which the larger chases are braced. Type and chase together are known as the forme. Locking up enables the forme to be lifted and moved about without a single letter being displaced,

and it holds every type and space in position during printing. It is to make this lock-up possible that the lines have to be justified to fill an exactly even measure.

When it is no longer needed, type which has been set by hand is sometimes distributed back into the cases from which it came. Worn or mechanically set type is melted down for re-casting, and then distribution is usually understood to mean melting.

BOOKS

- DE VINNE, THEODORE LOW A treatise on the processes of type-making: the point system, the names, sizes, styles and prices of plain printing types (The practice of typography) New York, 1900 type examples. [Like the other book by DE VINNE below, and like LEGROS and GRANT, also below, partly obsolete in technical passages, but still valuable for the author's methodical approach and for accuracy in detail.]
- DE VINNE, THEODORE LOW Modern methods of book composition: a treatise on type-setting by hand and by machine and on the proper arrangement and imposition of pages (The practice of typography) New York, 1904 illustrations.
- GOUDY, FREDERIC W. Typologia: studies in type design and type making, with comments on the invention of typography, the first types, legibility and fine printing ~ California, 1940 illustrations.
- LEGROS, L. A., and J. C. GRANT Typographical printing surfaces: the technology and mechanism of their production Longmans Green, 1916 illustrations. [The most thorough account of the technology of type production, and the first to include machine composition.]
- TARR, JOHN C. Printing today (The pageant of progress) Oxford University Press: 3rd edition, 1949 illustrations: bibliography. [A useful general introduction to printing, written for young people.]
- THOMAS, DAVID Type for print: or what the beginner should know about typefounding, letterlesign and type-faces ... - Whittaker: 2nd edition, 1947 - illustrations: bibliography.
- TYPEFOUNDING Fournier on typefounding: the text of the Manuel Typographique (1764-1766), translated into English and edited with notes by Harry Carter Soncino Press, 1930 illustrations: bibliography.
- WHETTON, HARRY (editor) Practical printing and binding: a complete guide to the latest developments in all branches of the printer's craft Odhams Press, 1946 illustrations.

Composing machines

The mechanization of the printing trade during the 19th century initiated a number of experiments in mechanical composition. Most of them produced nothing but failures. The most obstinate difficulties were to maintain the supply of types, to justify the lines, and to distribute the type after printing. During the 1890's, however, the obstacles were outflanked. Entirely new methods of text composition and casting were invented, and machines became capable even of the delicate craft of punch-cutting.

Until that time, punches had been cut by hand. Some of the small founts used in the early days of typography were masterpieces of precision, not less marvellous than the finest engraving in precious metals. Equally, inferior punch-cutters produced letters hideous and inept enough to astonish; and between the masters and the bunglers a host of mediocrities was usually at work.

Now this variety of performance has been smoothed into a level of mechanical accuracy. The punch-cutter is no longer called on to translate a design into metal. Instead, the outline of a letter, enlarged to great size, guides a cutting tool which reproduces it in steel in the required proportions and with more than human accuracy. Any irregularities seen in machine-set type-faces are therefore part of the designer's intention, not the result of an engraver's idiosyncrasy or the effect of hand-tooling upon metal. The punch-cutter has been replaced by the letter-designer.

§ 21 · THE LINE-CASTING PRINCIPLE

The invention of mechanical composition was based on the technique of combining casting with composition, instead of first casting types and then composing them. The earliest composing machine which was entirely successful is called the Linotype. By means of a keyboard, similar to that of a typewriter but more complex, the operator selects and assembles matrices and adjustable spaces in due order from magazines. When the line of matrices and spaces nearly fills the measure, he presses a control lever which sets in motion a series of automatic processes, which continue while he is assembling matrices for the next line.

The first of these processes is the justification of the line of matrices. The adjustable spaces, or space-bands, are wedge-shaped, and are forced upwards between the word-groups of matrices until they space the line out to fill the measure.

The justified line is then presented to the slit-shaped opening of the mould (the width of which is the measure, and the depth of which is the body) and molten type-metal is injected through the mould into the matrices. When this cools and hardens, and has been automatically trimmed to size, it forms a type-high metal bar or slug with letters running along its top—a line of type. The matrices and space-bands are separated and returned to their various magazines, ready to be used again.

The principle of movable type, then, is discarded by this machine, and text is printed from lines each of which is a solid block of characters and spaces. The nature of the printing surface reverts to that of the wood block which preceded typography. The matrix has left the letter foundry and entered the composing room.

The Intertype composing machine is similar in principle to the Linotype, and much of the equipment of the two machines is interchangeable. The details of line-casting methods which follow can for the most part be taken to apply to both, even when only one is mentioned.

§ 22 · THE MAGAZINE

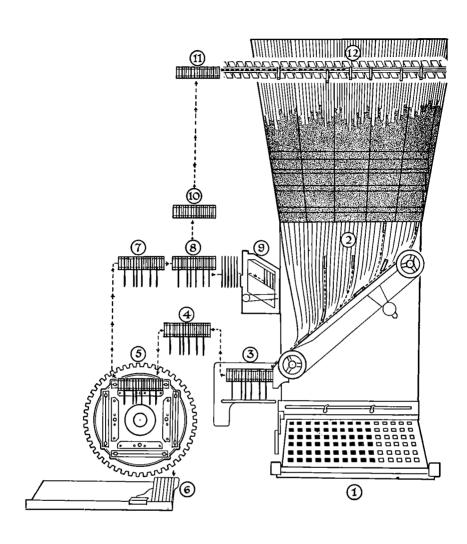
The matrices of line-casting machines are contained in wide, flat magazines, several of which at a time can be fitted above the keyboard of the machine. The magazine is divided into a number of channels running downwards towards the keyboard, and each channel is loaded with a number of matrices of one kind, just as each box in the compositor's case contains a number of types bearing the same character. The standard magazine has ninety channels for founts from $4\frac{3}{4}$ -point to 18 and sometimes

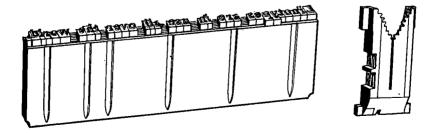
FIGURE 11 (opposite). A diagram of the Linotype composing and casting machine.

- 1. The keyboard: each key, when pressed, releases a matrix from one of the channels in the magazine above.
 - 2. Matrices leaving the magazine.
 - 3. The matrices are assembled in order, with space-bands from 9 above.
 - 4. The composed line of matrices and space-bands is automatically transferred to the mould.
- 5. The line is presented to one of the four moulds in the mould-wheel. The space-bands are pressed upwards until the line exactly fills the measure, and metal is injected into the matrices.
 - 6. The cast slug is trimmed and ejected into the galley.
- 7 and 8. The matrix line is removed upwards from the mould, and the space-bands are separated from the matrices.
 - 9. The space-bands are collected ready for further use.
- 10, 11, and 12. Each matrix passes along the distributor bar until released by its combination of teeth at the appropriate point, where it falls into its channel in the magazine.

Below, left—a Linotype slug.

Below, right—a Linotype duplex matrix—that of a roman and italic capital.





36 Then Jesus sent the multitude away, and went into the house: and his disciples came unto him, saying, Declare unto us the parable of the tares of the field.

37 He answered and said unto them, He that soweth the good seed is the Son of man:

38 The field is the world; the good seed are the children of the kingdom; but the tares are the children of the wicked one;

39 The enemy that sowed them is the devil; the harvest is the end of the world; and the reapers are the angels.

40 As therefore the tares are gathered and burned in the fire; so shall it be in the end of this world.

41 The Son of man shall send forth his angels, and they shall gather out of his kingdom all things that offend, and them which do iniquity;

36 Then he left the crowds and went into the house. And his disciples came to him, saying, "Explain to us the parable of the weeds of the field." 37 He answered, "He who sows the good seed is the Son of man; 38 the field is the world, and the good seed means the sons of the kingdom; the weeds are the sons of the evil one, 39 and the enemy who sowed them is the devil; the harvest is the close of the age, and the reapers are angels. 40 Just as the weeds are gathered and burned with fire, so will it be at the close of the age. 41 The Son of man will send his angels, and they will gather out of his kingdom all causes

4. Interpretation of the Parable of the Tares (13:36-43)

- 36. Then he left the crowds: The interpretation is addressed to his disciples; so are the parables which follow.
 - 37. Son of man in the apocalyptic sense.
- 38. For Matthew and his church the missionary field is the entire world (as in 28: 19). A few Jewish parables compare the world to a garden. Sons of the evil one is the harsh judgment passed on the Jews in John 8:41, 44. Does Matthew perhaps believe that some people are inherently evil?
- 39. Συντέλεια αἰῶνος (οτ τοῦ αἰῶνος) is a favorite phrase of Matthew's; in fact these are the last words in the Gospel (28:20). The Hebrew word 'ölām (ロጛነນ) can mean world or age. Its end or consummation is the beginning of the age or world to come. Similar expressions are found in Dan. 12:4, 13; Test. Levi 10:2; II Baruch 13:3; 27:15; etc.
- 41. A distinction is drawn between the kingdom of the Son of man, i.e., the church, and the Father's kingdom (vs. 43). Here the angels accompany the Son of man, as they accompany God when he comes to judgment in Enoch 1:3-9. Jesus therefore is given the prerogatives of the Father. Men are spoken of as "scandals" or causes of sin, as in 16:23, where RSV translates the word as "hindrance" (cf. on 11:6). Evil-doers, literally

the gospel to the village green. The kingdom works by contagion in day-by-day friendship. No handclasp is in vain; no word of witness fails of its purpose. Not always can the revolution be seen, but it moves on its course. It is irresistible. It gives lightness and wholeness to the world—till the whole [is] leavened.

36-43. The Interpretation of the Parable of the Tares.—These verses confront the expositor with an even harder task than that posed by the interpretation of the parable of the sower. For the latter story has all the marks of genuineness, even though its accompanying interpretation may be of later authorship; whereas both the parable of the tares and its accompanying interpretation show signs of redaction. These verses now before us ignore the main point of the

parable—the problem of what to do when false wheat and true wheat grow close together over all the field, but by that very ignoring we see revealed the problems of the early church. The conclusion is largely apocalyptic in nature. We are almost obliged to regard it, not as the word of Jesus, but as the product of the church in the last years of the first century.

Yet as such it has its truth. The definition of sin in vs. 41 ("doers of lawlessness") has rigor and verity. Crime is a breach of the public law, sin is a breach of God's law. Many crimes are never brought to justice, but no sin evades the justice of God; for the divine recompense is written both in the man and in his world. The definition hints at libertinism in the early church. If so, the warning has a sharp edge.

418

FIGURE 12. A complicated example of Linotype setting, designed by George Salter. The Exegesis in the centre of the page includes roman, italic, bold upper- and lower-case, and numerals; Greek upper- and lower-case; Hebrew: and a number of special sorts in italic—more than nine alphabets. Set in Linotype Baskerville: reduced from 10 in. deep.

24-point; certain machines have 72-channel magazines for larger founts. These two kinds of magazine are used with the main keyboard.

Certain models have an additional side keyboard, for composition from 34-channel magazines. This kind of magazine is normally used for display alphabets—up to 36-point upper and lower-case, or up to 48-point titling alphabets (§ 97) cast on a 36-point body—but may be used for text founts.

The capacity of the line-casting machine depends on the model in use; there are several different kinds of Linotype and Intertype, each with a different performance. The simpler makes are non-mixers, that is, each line of matrices can be set from one magazine only. Some of these machines can be equipped with four main magazines, each of which can be used for separate lines; matrices from one magazine cannot be mixed in the same line with matrices from another.

Another kind of non-mixer can be equipped with four additional 34-channel side-magazines, each of which can be used for the setting of separate lines. Such machines as these offer a choice of up to ninety matrices for any one line, composed from the main keyboard; within one setting, however, the operator may use up to 496 matrices, if side magazines are used. Since many of the matrices are struck with two characters (§ 23), the number of characters available is very much greater than the number of matrices.

Mixer line-casting machines are more versatile. Equipped with four main magazines, they can mix the matrices from any adjacent two in a single line; and on changing to another line, can bring into use another adjacent pair. The operator therefore has a choice of up to 180 matrices for each line, and 360 matrices for the setting.

Mixers with side-magazines, when equipped with four side-magazines, can mix in one line the matrices from any adjacent pair of main magazines and from the upper or the lower pair of side-magazines. The operator has in fact an equipment of 248 matrices for a single line, and of 496 for the whole setting.

This enormous capacity of matrices, which is the characteristic of the more elaborate line-casting machines, may be useful or even essential for the composition of newspapers, magazines, catalogues, and the like, where a great variety of types is used, but is rarely needed for bookwork. There are occasions when a high matrix-capacity would be extremely useful, as for instance in composition where several kinds of non-roman letter are to be used, but the keyboards of line-casting machines are limited to ninety keys on the main and thirty-four on the side keyboards. Different varieties of the same letter are therefore easier to produce than a variety of different letters or accents.

In addition to the matrices which can be brought down from the magazines by the keyboard, matrices of special sorts can be kept in boxes beside the keyboard and inserted manually in the line before justification; after casting they are returned automatically to the box. This naturally slows down the processes of composition and casting, and is not generally used for more than a limited number of special sorts.

The most conspicuous casting fault in line-casting machines results as a rule from inadequate maintenance in the printing-office. If the matrices are not regularly cleaned they begin to wear, and the side-walls on each side of the letter tend to become concave, so that when two matrices are side by side in the line the metal penetrates some way between them and makes a type-high hair-line between the letters.

§ 23 · THE MATRIX

Text matrices for line-casting are usually duplex; each has two characters punched into it, one above the other, and either of these can be used for casting. A common arrangement, for instance, is to have each of the roman capital letters duplexed with the same letter in the italic capital alphabet. Display matrices are usually single, but in certain series duplex matrices up to 24-point are available.

A minimum text fount consists of five alphabets, which with ligatures, figures, and so on make a total of some 194 characters (§ 19). In addition to these, some if not all of nine more sorts are likely to be useful (% \mathcal{L} ... []* † ‡§), making the total up to 203. Ninety duplex matrices, however, available for one line from a non-mixer machine, contain not more than 180 characters and spaces, and some quite commonly used sorts must therefore be put in by hand. If bold roman upper and lower-case are needed, and they are often useful in book production, they too must be put in by hand unless a mixer machine is available; the same is true of any other extra alphabets.

The pairing of characters on the matrices imposes certain characteristics on founts designed for line-casting. As originally written and printed, for example, italic lower-case letters were always narrower in set and often more closely fitted than roman lower-case. Since italic and roman lower-case letters for line-casting are usually duplexed with each other and cast from the same matrix, a with a, and so on throughout the alphabet, each letter in each of the two alphabets is usually designed to have the same set as its mate, and the italic letter therefore tends to be either less closely fitted or no less narrow in width than the roman.

In the same way, small capitals are commonly duplexed with ligatures, numerals, and punctuation marks, and this sometimes causes a lateral

compression of some letters. In order to avoid these deviations from the conventional proportions, certain Linotype text founts are equipped with special lower-case italic alphabets which are not duplex, and which show the lateral compression and close fitting typical of italic letters. Special 'true-cut' small capitals are available for some founts, and here the roman small capitals are duplexed with sloped small capitals. The latter alphabet, not traditionally part of the printer's equipment, may be found very useful as a variant in the composition of headlines and cross-heads (§§ 92, 93).

This is the ordinary Janson italic.

This is the special solus italic of the same fount.

JANSON'S ORDINARY DUPLEX SMALL CAPITALS.

JANSON'S TRUE-CUT ROMAN SMALL CAPITALS.

A mated bold is available for use with some line-cast founts. As a rule, the bold upper-case is duplexed with the ordinary upper-case, and the bold lower-case with the ordinary lower-case. This limits the set of the bold letters, and therefore usually the thickness of their main-stroke; if very thick main-strokes are used with a letter of ordinary set, the counters will be so diminished that legibility will suffer. As a result, the mated variants of line-cast founts tend to be semi-bold rather than bold; several have series names of their own, as text designs in their own right, and they are sometimes less unattractive and more legible than fully bold alphabets.

Another peculiarity of the line-casting matrix results from the composition of the matrices side by side in a line. When they stand side by side, ready for casting, each recessed letter must be in effect an island, within its own boundaries; one letter cannot overhang the next character or space, or intrude into its rectangle in any way. In short, no kerning whatever is possible. Roman letters can present a tolerably conventional appearance without kerns, but traditional italic designs are as a rule based on the possibility of kerning; such letters as f and g are examples. For this reason, and because of difficulties with set and fitting, line-cast italics rarely follow traditional forms in all details; the most successful designs are in fact sloped romans rather than italics.

§ 24 · SPACING AND CASTING

The variable space-bands which are used to justify the lines before casting are the same for all founts, although three kinds of space-band are

available. The extra thin space-band, which should be used for bookwork, expands from approximately 2 to $5\frac{1}{2}$ points; thin and thick space-bands begin at about $2\frac{1}{2}$ and 3 points. Since there is no variable space narrower than 2 points, the word-spacing in a 6-point fount cannot be less than the equivalent of a thick space, and will usually be more. For text founts of usual size, however, a minimum space of 2 points is quite narrow enough.

Fixed spaces of $\frac{1}{2}$, 1, and 2 points can be put into the line by hand, and thin, en, and em spaces are available on the keyboard.

The measure capacity of the Linotype is up to 30 picas, or 36 with special equipment which is not possessed by all printers; that of the Intertype, up to 42 picas with standard equipment. Bodies can be adjusted to within a fraction of a point; this may be particularly useful in making the text fit an exact extent, or in producing type with exactly the right amount of interlinear space. Since any fount can be cast on a larger body than its own, leading is unnecessary; instead of leading 11-point type 2 points, for instance, the type is cast as 11-point on a 13-point body.

The metal used for line-casting is necessarily rather softer than other type-metals, because of the greater size of the casting. For this reason, books are rarely line-cast if they are to be repeatedly proofed, or if they are to be printed from type in long runs or in several impressions (see also § 130). Any number of slugs can be cast from a single line of composed matrices, before the matrices are returned to the magazine.

§25 · FOUNTS AND SERIES

The ranges of types designed for the line-casting machines are based on the requirements of newspaper and magazine work, and faces of this kind make up most of the range of both Linotype and Intertype. The makers of both machines have, however, turned their attention to bookwork, and the Linotype has more than twenty series suitable for text composition in books. Line-casting is widely used by American bookwork printers, and the Linotype range includes contemporary series by American designers. Some seven text series are available on the Linotype only; two more, though similar in origin to series available on other machines, are rather different in appearance. The Intertype range is rather smaller, and includes no bookwork series not available on other machines.

Line-casting machines are not particularly well equipped with display founts in their composition series, most of which have no founts larger than 14-point. Many typographers like to use the same series for the display of a book as for its text, but no important principle is involved; if large sizes of the text series are not available for the display, a suitable display fount can usually be found among founder's types (§ 97) or from

the range of another machine. An extensive equipment for composition in foreign languages in roman and other letters is available for line-casting, as for single-type composition, but the subject of this equipment is too wide for discussion here.

In addition to letters, line-casting machines can produce a wide variety of ornamental borders, rules, and dashes, and the Linotype range for instance includes many hundreds of these units. The maximum width of casting such material is the same as for type. Ornamental material is cast on bodies up to 36-point and in measure up to 30 picas.

§ 26 · SINGLE-TYPE COMPOSITION

Shortly after the invention of the Linotype, the Monotype¹ keyboard and caster came into being, and since the early 1900's all the industrial book printers in Britain have equipped themselves with these machines. The Monotype keyboard and caster are separate from each other, and one controls the other only indirectly.

By tapping a key the keyboard operator punches two holes in an unrolling spool of paper; the position of these perforations is different for every key. Between words he taps the key for a variable space. When the pointer which moves along a scale in front of him indicates that the line is nearly complete, he reads from another scale the numbers of the appropriate justification keys which will expand the variable spaces to the required width, and taps these keys. As the spool is punched, it is automatically wound into a detachable roll. When the finished spool is removed from the keyboard, the last-made of the perforations is on the outside of the roll. In due course the spool is fixed on the caster and drawn through it.

Monotype characters are cast one at a time from single matrices, contained in a rectangular frame known as the die-case or matrix-case. The shank of the letter is shaped by a mould; the mould's body remains constant during the casting of each job to produce types of the same body, but the set of each character cast is determined by the movement of a steel wedge which adjusts the set of the mould. Molten type-metal is injected from below into the mould, and into the matrix above it. The injecting nozzle and the mould are fixed in position; the matrix-case moves to and fro and from left to right over the mould, presenting for casting first one matrix and then another.

Each perforation in the spool allows compressed air to pass down one of thirty-one pipes. The air raises one of several stop-pins in a pin-block; the

¹ The word Monotype is a Registered Trade Mark, which should not be used in a descriptive sense. By kind permission of The Monotype Corporation Limited the word is used in this book without quotes.

raised pin halts the movement of an arm attached to the matrix-case, and determines how far the matrix-case is to move. Of each pair of perforations punched by a key, one governs the movement of the matrix-case in one direction; the other governs its movement in a direction at right angles to the first. In this way the two perforations adjust the position of the matrix-case over the mould, and determine which letter is to be cast.

The last-made perforations on the spool are the first to pass through the caster. The first perforations of any line which control the caster are therefore those of the justification keys. These adjust the position of steel wedges which determine the width of the variable spaces in the line, so that the cast line exactly fills the measure. When a complete line is cast, the justification perforations of the next line not only readjust the position of the wedges but transfer the completed line from the caster to a galley.

§ 27 · THE MATRIX-CASE

The matrices in the matrix-case are arranged in rows. There are either 15 or 17 rows across the case (modern cases have 17), and 15 up and down, so that the case contains either 225 or 255 matrices. The smaller matrix-case usually contains a complete fount of five alphabets, with a number of extra sorts; by removing some of these sorts, seven alphabets can be fitted into the larger, or extended, matrix-case. The operator may therefore have available not only roman and italic upper and lower-case and small caps, but bold roman upper and lower-case, or some other mated fount.

The position of the wedge which determines the set of each of the characters is the same for all the characters in any one row across; all the characters in one row have the same set. The narrowest letters are in the top row, slightly wider letters are in the second, and so on down to the widest in the bottom row; there may be more than one row of matrices with the same set.

The set of Monotype characters is regulated by the unit system, which is peculiar to this kind of machine. All characters are cast in sets which are multiples of a fixed base unit. This fundamental unit is one-eighteenth of one point (.0007685). The set of a Monotype fount is the width in points of its widest characters; a wide 12-point fount may be more than 12-set, a narrower one less than 10. The unit of set of a fount is the product of the fundamental unit and of the set as expressed in points; the unit of set of a 12-set fount is therefore twelve-eighteenths of a point. The widest character in most matrix-cases is 18 units (in a 12-set fount, [18×12]/18 or 12 points) and the narrowest is usually 5; in one matrix-case arrangement, the unit values of the rows are 5, 6, 7, 8, 9, 9, 9, 10, 10, 11, 12, 13, 14, 15, and 18. All the characters in the fount contained in this case have

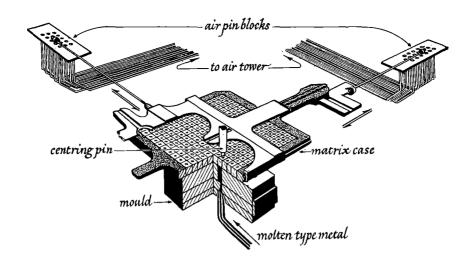
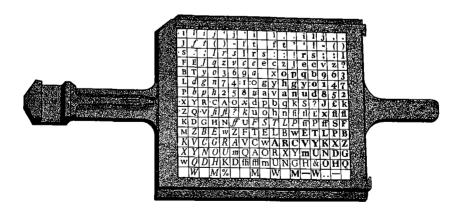


FIGURE 13. Part of the Monotype caster. Each key on the keyboard which represents a letter causes two holes to be punched in a spool of paper. When the spool is run through the caster, compressed air passing through one of these holes causes a stop-pin in an air pin block to rise.

This pin controls the length of travel of the draw-rod, and so determines which row in the matrix-case is to be aligned under the centring pin and over the mould orifice.

The set of the mould orifice is adjusted according to which unit-row of the matrix-case is selected for casting. In the matrix-case (below), all the matrices in any one row have the same set.

Air passing through the other hole in the spool controls the other air pin block and draw-rod, and so determines which matrix in the row is to be presented to the mould.



only twelve different sets between them. In the early days of mechanical setting connoisseurs condemned this limitation as distorting the forms of the letters, but few if any readers or typographers could now tell the difference between founder's type and that of the Monotype by looking at the set of the letters. In some series the unit-value of the bottom row is more or less than 18 units; since the narrowest character is still 5 units, there is a greater or smaller difference in width between the widest and the narrowest characters.

The matrices can be removed from the matrix-case and rearranged within the limits imposed by the capacity of each unit row. If, for instance, no small capitals are needed in a book, they may be taken out of the matrix-case and replaced by other letters with the same unit values. Greek and other non-roman letters can to a certain extent be accommodated in the same matrix-case as roman, though so great a number of accents may be needed (in Greek, for instance) that some may have to be inserted by hand into the lines of the composed type. Even though cast separately, the character has a unit value, and instead of tapping the appropriate key the operator sets a fixed space or character of the same unit value as the missing character. A hand-compositor, working on the cast type, can then remove the space or character and insert the correct character without having to re-justify the line.

The capacity of the matrix-case becomes inadequate only when a fairly elaborate style is required. Certain kinds of textbook might require bold roman and bold italic upper and lower-case and numerals, in addition to the usual five-alphabet fount; this would be possible only by inserting parts of the text or some of the headings by hand. For all ordinary bookwork, however, the matrix-case contains enough matrices.

§ 28 · LETTER DESIGN

The arrangement of the matrix-case allows of individual set-widths for italic and small-capital alphabets, the characters of which can therefore be designed more or less in traditional proportions. A mistake in fitting is of course possible, since the matrices can be removed from their case; a character placed too low in the matrix-case will show extra space on the left. This is sometimes done with intention, in order to separate such punctuation marks as!?:; slightly from the word they follow; the resulting space between word and punctuation mark may be narrower than the narrowest fixed space.

Since the letters are cast one at a time, kerning is possible; the letter is cast with its kern overhanging its body, and the body of the next letter to

¹ Fournier and Bell founts, for instance, are 20 units, Poliphilus 17.

be cast moves up under the kern and supports it. The italic lower-case letters can therefore take on the flowing forms of tradition, and indeed the Monotype system as a whole lends itself to all that is now considered best in letter-design.

§ 29 · SPACING METHODS

The spacing system of the Monotype machine is capable of fulfilling the most exacting requirements. When the keyboard operator taps the space-key which produces a variable space, the value of that space would by itself be 4 units; the justification wedges will of course increase this amount, however slightly, in order to fill the line. When founts of 12-set or less are being used, the initial value of the variable space can be reduced to 3 units, in order to produce narrower word-spacing. Still narrower word-spaces begin to become imperceptible, but if necessary they can be formed by using the technique of letter-spacing between words; the machine has to be equipped with a combined spacing attachment, by which the space is cast on the same shank as the adjacent letter to the right of it.

The narrowest fixed space on the Monotype is usually 5 units; the other fixed spaces are normally 6, 9, and 18 units (roughly equivalent to a middle and a thick space, an en and an em quad).

Letter-spacing is usually carried out by means of the unit-adding attachment. This takes some time to adjust, and should be used in the same adjustment throughout the work; whenever letter-spacing is used, it should be the same, whether 1, 2, or 3 units.

SMALL CAPITALS LETTER-SPACED ONE UNIT

CAPITALS LETTER-SPACED ONE UNIT

SMALL CAPITALS LETTER-SPACED TWO UNITS

CAPITALS LETTER-SPACED TWO UNITS

SMALL CAPITALS LETTER-SPACED THREE UNITS

CAPITALS LETTER-SPACED THREE UNITS

Letter-spacing of 1-unit is usually considered narrow, 2-unit medium, and 3-unit wide, at least in text composition. When the unit-adder is in action, it increases the unit value of every character, including the word-spaces, which therefore become wider by double the amount of the letter-spacing.

The widest measure possible on the Monotype is 60 picas.

NORMAL (FOUR-UNIT MINIMUM) WORD-SPACING

The outlook for typography is as good as ever it was—and much the same. Its future depends largely on the knowledge and taste of educated men. For a printer there are two camps, and only two, to be in: one, the camp of things as they are; the other, that of things as they should be. The first camp is on a level and extensive plain, and many eminently respectable persons lead lives of comfort therein; the sport is, however, inferior! The other camp is more interesting. Though on an inconvenient hill, it commands a wide view of typography, and in it are the class that help on sound taste in printing, because they are willing to make sacrifices for it. This group is small, accomplishes little comparatively, but has the one saving grace of honest endeavour—it tries.

THREE-UNIT MINIMUM WORD-SPACING

The outlook for typography is as good as ever it was—and much the same. Its future depends largely on the knowledge and taste of educated men. For a printer there are two camps, and only two, to be in: one, the camp of things as they are; the other, that of things as they should be. The first camp is on a level and extensive plain, and many eminently respectable persons lead lives of comfort therein; the sport is, however, inferior! The other camp is more interesting. Though on an inconvenient hill, it commands a wide view of typography, and in it are the class that help on sound taste in printing, because they are willing to make sacrifices for it. This group is small, accomplishes little comparatively, but has the one saving grace of honest endeavour—it tries.

DANIEL BERKELEY UPDIKE

COMBINED SPACING

The outlook for typography is as good as everit was—and much the same. Its future depends largely on the knowledge and taste of educated men. For a printer there are two camps, and only two, to be in: one, the camp of things as they are; theother, that of things as they should be. The first camp is on a level and extensive plain, and many eminently respectable persons lead lives of comfort therein; the sport is, however, inferior! The other camp is more interesting. Though on an inconvenient hill, it commands a wide view of typography, and in it are the class that help on sound taste in printing, because they are willing to make sacrifices for it. This group is small, accomplishes little comparatively, but has the one saving grace of honest endeavour—it tries.

DANIEL BERKELEY UPDIKE

Three kinds of word-spacing; set in Van Dijck.

§30 · CASTING

Since only one small piece of type is cast at a time, the metal used in the Monotype caster is quite hard enough to withstand proofing, moulding, and make-ready. If a long run from type is to be expected, extra hard metal can be used.

Worn equipment, inadequate maintenance, or careless running may cause casting faults to appear in the letters; these usually take the form of extra thicknesses on the outermost curves of the letters, and knobs or spurs at the end of serifs. This distortion of the letters is a blight on British typography; far too many books, even those printed at famous presses, suffer from it, and typographers should do their utmost to eradicate it, with vigilance before the event or protests after.

§31 · THE MONOTYPE RANGE

The Monotype composition caster can produce type in sizes from 4½ to 14-point; when fitted with a special low-speed gear, it can cast composed type up to 24-point. The matrix-case for these larger sizes contains on average about ninety matrices. The mould sizes of the smallest bodies are graded to the nearest ½-point; those of the normal text bodies, to the nearest ½-point, though not many printers have moulds of these sizes. As a rule, a typographer who specifies interlinear space to the nearest ½-point must expect a bill for the insertion of leads; if the interlinear space is 1 or 2 points, the point-size of the body can be increased by that amount, and no leads need be inserted. Some printers are equipped with moulds for casting the old bodies, such as pica and nonpareil, and being intermediate between point-sizes these may be useful. In figure 23 (§ 97), for instance, the Greek was set on old bodies in order to secure an exact coincidence of depth between Greek and English. The University Press, Oxford, has a number of old body moulds, here compared in inches with point sizes.

point	Monotype	old body	O.U.P.	point	Monotype	old body	O.U.P.
41	0.0588	Diamond	0.0579	11	0.1522	Small Pica	0.1445
5	0.0692	Pearl	0.0660	12	o·1660	Pica	0.1670
5 1	0.0760	Ruby	0.0710	18	0.2490	Great Primer	0.2351
6	0.0830	Nonpareil	o·o837	20	0.2767	Paragon	0.2546
7	0.0968	Minion	0.0972	21	0.2905	Double Pica	0.2864
8	0.1107	Brevier	0.1083	24	0.3320	2-line Pica	0.2862
9	0.1244	Bourgeois	0.1177	28	o·3874	2-line English	0.3362
IO	0.1383	Long Primer	o·1356	42	o·5810	3-line English	0.5779

Display lines in Monotype type-setting are usually set by hand from types cast on the machine. Spaces for hand composition are cast in sets to the nearest point, so that adjustments to word-spacing should be marked in points rather than in units or in the terms of spacing applied to founder's type. The caster can also produce border units for making up by hand; when fitted with a special display-type attachment, it can cast single display types for hand composition in sizes up to 36-point. Many book-printers are equipped with a Monotype supercaster, which can cast in sizes up to 72-point. The Monotype Corporation maintains a stock of display matrices for hire, so that any printer with the necessary caster can produce display type of many series without having to buy matrices.

An extensive range of text and display series is available for composition and casting by Monotype. In 1922 the corporation initiated a great programme of type design and matrix production, which has included the revival of classic founts from the days of hand composition, the commissioning of new series from contemporary designers, the adaptation of 20th-century types, and the addition of new founts and new series to those series and families already in existence. Several series consist of a range of founts from 5 to 72-point; there are related versions of light weight as well as semi-bold and bold designs, and alternative versions of wider and narrower set; and several series have related titling series. Initiated with sensibility, scholarship, and a clear understanding of the needs of modern printing, and carried forward by a staff of skilful draughtsmen, this programme has earned for the Monotype Corporation the typographic leadership of Europe.

The use, for fifty years, of the Monotype as the standard machine for bookwork of all kinds, has brought into being an immense range of matrices for special sorts. At some time during the last half-century, most languages, arts, and sciences have had their composition problems solved by Monotype equipment specially made for the purpose. This equipment is available to any printer who wishes to buy it; once the punches have been cut, the cost of matrices is not high.

§ 32 · SPECIAL COMPOSITION

Most books can be composed by standard methods and equipment, but there are some which present greater difficulties. The use of special sorts in both line-cast and single-type composition has already been mentioned, and a combination of handwork with keyboard setting is enough to produce most academic composition. Advanced mathematics, however, requires composition of the greatest intricacy; the foundations of the page may be laid on the keyboard, but the superstructure can be built only by the hand compositor. Single-type composition is essential here, and such work is usually given only to a specialist printer with the necessary skill.

Semitic languages, such as Arabic and Hebrew, are read from right to left and must be cast in the opposite direction to English. The line-casting

machine solves this problem by having the characters punched upsidedown in the matrix and reversing the slugs; the Monotype caster is fitted with a special reverse delivery attachment.

Many Oriental languages can be mechanically composed, but few printers outside the home of the language have the necessary equipment. Non-alphabetic languages have too many characters for convenient machine composition; Chinese, for instance, is set by hand at Oxford at a rate of about five characters per hour.

§ 33 · PHOTO-COMPOSITION

The techniques of book production, already completely transformed since the beginning of the 19th century, are undergoing still further radical change, which results from the growing use of printing methods based on photography (chapter 15). Methods of composition now being evolved, or even in use, provide photographic images of letters instead of types cast in metal. The photographic negative or positive of the composed text is combined with photomechanical techniques (such as those described in chapters 13 and 15) to produce printing surfaces of various kinds. Such printing surfaces are already widely used; but to produce them today most printers must first compose and cast type in the usual way, then pull clean reproduction proofs, and finally transfer the proofed image to the printing plate by photomechanical means. Even then, if a photographic positive is wanted, a further process of conversion from negative to positive is necessary. This succession of processes causes not only expense but a certain deterioration of the image; the increase of cost and loss of quality are both avoided by photo-composition.

As during the 19th century various different methods of mechanical composition struggled for the lead until the emergence of the line-casting and single-type techniques now in use, so now the issue between several kinds of photo-composition is in doubt. Some machines are already in the printing-office, in both Britain and America, while others are still in the workshop, but the battle is not necessarily won by the first in the field. Types of photo-composing machines may be grouped as conventional or unconventional. The former are based on existing composing machines, and admit some of the same limitations, or nearly the same; unconventional machines break past most of these barriers and offer entirely new possibilities in composition. Considerable advantages are common to both groups of machine for certain kinds of work; for small jobs, however, and for short runs, present methods of type-casting seem likely to retain their usefulness.

Five types of machine are either in use at the time of writing or are nearly ready. The Intertype Fotosetter has been used for a number of books in America since 1952; the Graphic Arts Research Foundation has produced the Photon, which set its first book in 1953; the Westover Rotofoto was used for an Italian novel in 1954; at the time of writing, the Monotype Corporation's Monophoto and the Linotype Filmsetter are in an advanced stage of development. All but the Photon and the Filmsetter may reasonably be described as conventional machines.

Single-type casting is already well adapted to bookwork; it is the conventional line-casting machine which gains most by adaptation to photosetting, having more limitations to overcome. The Fotosetter, for instance, can produce fully kerning and closely fitted images of letters, because the exposure of one matrix at a time gives the machine the advantage of single-type composition. This machine, on the other hand, like the Rotofoto, employs a method of justification by letter-spacing, a technique which differs from the standard of text composition to which the typographer and reader are now generally accustomed.

Advantages common to most photo-composition machines include the possibility of enlarging or reducing the photographic image from any set of matrices. Indeed one machine is advertised as producing a complete range of founts from 6 to 36-point from two sets of matrices. By tradition, the proportions of big letters are fundamentally different from those of small, and it is possible that the advantages of photo-composition may not compensate for the use of one design for a wide range of sizes. Some machines will be able to produce images in sizes intermediate between the conventional fount sizes, so that for instance a $10\frac{3}{4}$ -point fount could be produced in any series.

Letter-forms for which kerns are otherwise necessary can be reproduced with ease by photo-composition. The letter T, for instance, may be made to overhang short letters without extra cost (Tea and Toast), and swash letters can be fitted closely round lower-case.

The unsatisfactory reproduction of printed type by photogravure (§ 149) is the most conspicuous weakness of that process. The gravure image is composed of a diagonal pattern of minute rectangular recessed cells, the corners of which serrate the outline of the letter. Special gravure matrices, however, may eventually be available for photo-composition, in which the letter is built up of a similar pattern of cells cut short at the edge of the letter to give it a sharp outline.

Unconventional techniques of photo-composition offer even more striking opportunities. The Graphic Arts Research Foundation of America is developing the Photon machine, which seems to exploit to the full the advantages of photo-composition over casting in metal. The matrix-case is replaced by a glass disk of 8" diameter, on which 1,440 characters are arranged in concentric circles. A new arrangement of characters can be

photographically transferred on to a disk in an hour, and duplicates can be made within minutes, so that the cost of matrices will be much reduced. The slightest change in matrix arrangement will of course necessitate a new disk. The capacity of the disk is equivalent to more than six complete founts, each of five alphabets; if a suitable keyboard can be devised, this should do away with all problems of matrix availability for alphabetic languages. Different body-sizes, sets, and even different series can be mixed freely in the same line.

So far the tendency seems to be to make photo-composing keyboards with fewer keys than on metal-casting machines, rather than with more, although the former machine may offer the operator a wider choice of matrices than the latter. This suggests that the photo-composing machine may make possible a large number of variations on standard letters, but not a very wide range of accents, or, for example, the possibility of setting Arabic, Greek, and roman letters together.

The chief difficulty encountered in the development of photo-composition is that of correction and make-up into pages, with the insertion of separate settings, such as headings and footnotes, into the main text. Only complete success with this part of the technique will ensure both economy and high quality in production.

BOOKS

- BOWER, W. M., C. MITCHELL, E. PHEBY, and H. E. WAITE Mechanical type-setting (Printing theory and practice, number 3) Pitman, 1947 illustrations. [After subsequent titles in this series, the series title will be abbreviated to P T & P, followed by a figure indicating the book's number in the series.]
- MONOTYPE The Monotype machine book of information: facts, tables, technical hints etc., with sections on punctuation, printing history, paper, casting-off, etc. Monotype Corporation, 1946 16mo.
- See also, after chapter 1, JENNETT; after chapter 2, CHAUNDY; and, after chapter 5, LEGROS and WHETTON.

Choice of type for the text

Five centuries of printing history have seen many hundreds of different type-faces come into use and fall out of favour. European printing began with types copied from various forms of the written Gothic or Black Letter, and types of this kind are used in Germany to this day. The historic half-uncial letter survives in Irish printing, and the Greeks retain their even more ancient script; the Russians too have their own kind of letter, and there are some curious and beautiful Asiatic faces. Among the English-speaking peoples, however, and over most of Europe and much of Africa, it is roman minuscules, relieved with a scattering of roman capitals and sometimes with italic, that are used for text composition.

For centuries in Europe and in America, nearly every generation has brought forth printing types based on the roman letter but different from their predecessors. But it is only in detail that the letters have changed; the modern eye finds little or nothing unfamiliar in certain examples of roman typography produced as long ago as 1470, only a quarter of a century after the first known use of movable types in Europe. The changes have taken many forms and have usually been minute. The great majority of printing types, undistinguished by salient characteristics, have returned to oblivion.

In a sense, no types survive from previous centuries for mechanical composition, except for the very few cut for composing machines in the late 19th century. Founders' matrices cannot be used in the new machines, and nearly all text is now set by machine. But some of the old designs have been copied and adapted for mechanical composition; the text of this book, for example, is set in an adaptation of this kind. Some of the revivals can hardly be distinguished from the original; others have been changed almost beyond recognition, for better or for worse. From time to time, further classic revivals are produced, and there are also contemporary type-faces which show that the art of type-design is by no means dead. Occasionally some classic oddity is resuscitated for a few spectral appearances before being quietly reinterred. At the time of writing there are some three dozen or more type-faces in general use for text setting, as well as various faces which are available but appear rarely if at all.

An intimate knowledge of text types is essential to the typographer. A correct selection can be based only on familiarity with the whole field of choice. Types of one fount or series have an insidious habit of appearing in composition for the bulk of which another fount or series has been used, and although these intruders may not always be conspicuous the typographer must be able to recognize them. Knowledge of this kind can be gained from the various specimen books, pamphlets, and folders published by the firms which build machinery and produce matrices for text composition, and from the type specimen books in which printers catalogue and display their repertory.

The types now in general use are all capable of being read without difficulty; types which are not legible do not remain in general use for long. But the legibility of any series depends to some extent not only on the letter-forms but on the way they are arranged and printed. In the choice of text types, factors other than legibility have to be taken into account. A reasonably good choice may be easy; it is the best possible choice at which the typographer must aim.

§ 34 · AVAILABILITY

If the typographer intends a particular kind of machine to be used for the composition of the text, his choice of type-faces is limited to the range of matrices available for use with that machine. Some well-known series are common to two or three makes of composing machine, usually with differences in design of varying importance.

If a publisher's typographer feels that one type-face only will do for the text of a book, he will have to have the composition carried out by a printer who has the necessary founts of that series. Some typographers will not allow a printer who lacks the selected type to place the composition with another firm, since one printer cannot answer to the publisher for the quality of another's work. If on the other hand the work is to be placed with a certain printer—and since the choice of a printer does not as a rule depend primarily on his list of type-faces, this is perhaps the more usual routine—the series and fount will have to be chosen from among those with which he is equipped. To install a new series is a costly venture, not to be undertaken for a single book of the ordinary kind. A printer may, however, be willing to buy a new fount of a series of which he already holds some founts.

Trade composition houses, which are equipped for composition and duplication but not for printing, stock a much wider variety of matrices than do printers, and are usually no less capable of efficient text setting. Their charges, however, tend to be higher than those of book printers.

By no means all text composition series include a full range of founts. Even if the printer has all the founts in a series, he may have no fount suitable for footnotes or other small-type setting. A large book, or one which is to be rapidly produced, may have to be set and cast on more than one machine at a time; printers are usually equipped to do this only with the more popular type-faces.

If alphabets other than roman are likely to be used to any extent, a series may have to be chosen not only for its own qualities, but for the number and nature of its relatives. Not all text series have mated variants such as a bold roman and italic, bold condensed, and so on. If the text requires special sorts, the designer's choice of series will be limited to those with which these sorts are available. For this reason, nearly all the setting of advanced mathematics in Britain, for instance, has to be carried out in Monotype series 7 (§ 66). If the text requires the use of two or more unrelated series, such as roman with Greek or Hebrew or both, the various series will have to be chosen to align almost exactly at the main line with each other, and to have a similar lower-case x-height; otherwise they will appear to be hopelessly ill-assorted.

The quality of the related alphabets deserves only slightly less attention than that of the roman; this is particularly true of italic, which may be used for phrases, sentences, or passages of some length. Not everyone can feel much enthusiasm for a bold type of any kind, but some are distinctly better than others; the clearest tend to have rather open counters and loose fitting, to compensate for the extra weight of stroke.

§ 35 · LETTER-FORM

Good letter-form does not admit of easy definition, if indeed it can be defined at all. Other arts, under the scrutiny of generations of critics, have accumulated a technique and terminology of appraisal; the art of letter design has not. Certain plain virtues may, however, be described as essential to good letters.

The first of these is certainly the quality of familiarity. In overall proportions, in thickness of stroke and in shape of outline, every letter of a good fount must be similar, within reasonable limits, to the form of that letter to which readers are accustomed. The prime function of the letter is to communicate *instantly*, and any novelty of basic form may be a positive obstruction to smooth reading and even perhaps to recognition. Each letter, in fact, should be distinct from all the others, and capable of being recognized at a glance; but no letter should be so distinctive as to attract more than a glance.

To outline some of the lesser qualities of good letter-form may be easy

enough; to lay down precise rules of form and proportion, which has been attempted more than once, is of no value. In practice, the decision as to what is and what is not good letter-form rests with the taste of the individual typographer. Most printing designers agree to a large extent on the nature of good letter-form, and this agreement has its influence on the nature of type-design.

Shading has already been defined as the difference between thicker and thinner in the different strokes or the different parts of a stroke of a letter. One effect of shading is that two lines never meet or cross at their thickest points; where two lines meet, one is thick and the other thin, so that the counters are more open than if they were enclosed by strokes of full width along their whole length. By providing contrast at the points of intersection, and by enlarging the counters, shading imparts clarity as well as grace to the letter. These qualities are not conspicuous in particularly light founts, which have not enough contrast between the thickest and thinnest strokes. On the other hand, too marked a contrast between thick and thin may render a fount severe and dazzling in appearance; the printer's problem is to strengthen the attenuated hair-lines of such founts without distending the already overblown main-strokes.

When the shading is oblique it serves to emphasize the difference between certain letters. Thus in a b h m n and p the curves tend to be thicker at the top; in c d e q and u the curves are thicker below. Vertical shading, on the other hand, thickens the vertical strokes which are common to many letters, instead of the curves which are common to fewer, and so emphasizes their similarity to each other. This is not serious except where the contrast between main-stroke and hair-line is extreme; a pronounced vertical stress may reduce the alphabet to the appearance of a pattern of vertical strokes, tenuously connected.

abhmnp cdequ

Oblique stress, in Perpetua Bold, above; below, vertical stress in Bodoni Bold.

abhmnp cdequ

In text founts the end of almost every vertical or oblique stroke is emphasized by a serif, so that the stroke's length is defined by this extra mark. The serif also helps to indicate the difference between such characters as 1 (one), 1 (lower-case el), and I (capital i). Its most valuable function, however, is to reach out a little way from stroke to stroke, and by

combining the strokes and letters of a word into an entity, to emphasize the separation of words even though the word-spacing may be close. If a serif is to have any use at all, it needs to be clearly visible, and hair-line serifs supported by no bracket are of doubtful value. Types without serifs are known as sans-serifs, and most readers find them less suitable for sustained reading than types with serifs (figure 6, \S 14).

Shading and serifs are neither of them essential parts of the roman letter, which can be read without either, and unshaded, or slightly shaded, sans-serif letters for certain kinds of text setting still have their champions. Serif and stress are both accidental results of the penman's method; but they have become useful ornaments, among the comforts of reading and the elegances of letter-design, which there is no good reason to discard.

Equally important is the length of the ascending and descending strokes. Some series of contemporary design, and even some revivals of classic types, are disfigured by shortened extenders, a fault obvious to the eye accustomed to the roman letters of previous centuries. Something of the legibility and grace of well-printed books is sacrificed for the dubious convenience of those who wish to pack too many letters into too little space; nearly all modern books could properly be set in types having extenders of classic length. Type-designers chop the extenders short to allow the lines to be crowded together; typographers space the lines out again to compensate for this mutilation. It is to be hoped that future series will not be distorted in this way; or that if shortened extenders are designed at all, they will be supplied only at the special request of those who feel the need for them, the series being normally equipped with extenders of classic length. Carried to its extreme (as it is, curiously enough, in a well-known series designed for school-books), the shortening of extenders is a hindrance to the reader. Extenders are rarely too long in text series; when they are, they disfigure the page with a pattern of conspicuous vertical strokes.

If the fitting of the letters is close enough they will appear to combine clearly into words, even when there is—as there should usually be—very little space between words. A loosely fitted fount requires extra space between words and between lines, if the separate existence of words and lines is to be evident.

The design of the capital letters should be such that they will not be conspicuous in a page of lower-case letters. The relative thickness of mainstroke in capitals varies from series to series; it may be very little more than that of lower-case, or more than half as thick again. 12-point Centaur (§ 40), for instance, a fount of a series whose capitals are particularly handsome, shows very little contrast in main-stroke between capitals and lower-case; there appears to be no fault in this absence of contrast, since the capitals are quite easily distinguished from the lower-case, although

not particularly tall. On the other hand, capitals which are heavily drawn in proportion to the lower-case letters, are likely to stand out of the page and to give the setting an uneven appearance. Probably, then, a close similarity in thickness of main-stroke between capitals and lower-case is a good quality in any fount, and in particular for one which is to be used for text composition where capitals will be frequent (verse, for instance, in which each new line usually begins with a capital).

The height of capitals in relation to the short lower-case letters should also be considered, since disproportionate height, no less than disproportionate weight, will prevent capitals from combining effectively with lower-case. In some series, capitals are less than half as high again as short letters; in others, they are nearly three-quarters as high again. Since the capitals of 12-point Bell (§ 59), for instance, are almost exactly half as high again as the short letters, but are perfectly clear, this proportion appears to be quite enough.

Far more important than these details are the overall proportions of the letter, which are major factors in the abstruse problem of legibility.

§36 · LEGIBILITY

Legibility is the most important quality of the typographer's work, and is perhaps the least discussed of his major problems. The subject is delicate and complicated, and has been the subject of a good deal of research. The chief obstacles to successful research have been the lack of science among typographers and the ignorance of typography among scientists. Legibility appears to be too subtle a quality for measurement and analysis. But the typographer's problem remains: what are the principles governing text design which enable the reader to read with the greatest speed and accuracy possible to him, and with the least possible effort?

Here and there, throughout the processes of book design, the legibility problem appears and reappears in different forms. It is of course the chief factor in the choice of type for the text. The immediate question is how the legibility of a fount may be assessed.

A thick line is more easily seen than a thin line. This does not mean that a bold fount is more legible than a light one. A letter is not merely a line; it is a shape, built up of lines. Not only the lines themselves, but the shape of the letter, must be clear to the reader. Clarity is determined not only by the thickness of the lines, but by their distance from each other and from the lines of adjacent letters in the same word. If the lines are too close

¹ See the extensive bibliography given by R. L. PYKE in his Report on the legibility of print. A recent work of importance on this subject is that of SIR CYRIL BURT and others: 'A psychological study of typography' (The British Journal of Statistical Psychology, May 1955).

together or too far apart, their relative positions, and therefore the shapes of the letters, cannot be recognized immediately (as, for instance, in some black letter founts). The amount of white space within the letter (the counter), and between the letters (the fitting), is just as important as the thickness of the lines. In an ideally legible fount, then, the lines of which the letters were made would be of a thickness exactly appropriate to the size of the letters—that is, to their x-height and width.

There is no known method of calculating the appropriate proportions, or the pleasant variety of type designs now in use might already have shrunk to half a dozen or less. In any case, the characteristics of any fount vary according to the method by which it is reproduced. The typographer's task is to choose between several existing founts, not to design new ones, and his problem is therefore one of comparison rather than of precise definition. One of his decisions must be whether a fount is either too bold or too light to be entirely satisfactory. Comparing founts by means of printed specimens is not too rewarding a procedure. Slight differences of pressure, inking, and paper surface, for instance, may thicken one fount and diminish another.

The relevant measurements of founts, on the other hand, are not usually published, though they might be made available if there were more demand. Even if measurements can be ascertained, they have still to be translated into proportions, by methods which may not be generally agreed. Some examples of the uses that can be made of measurements appear in appendix B. Each typographer must decide for himself whether the methods of calculation are valid and whether the results are of value. The results do, however, provide some hard facts about certain founts, which may be used at least to supplement the suppositions on which typographers are usually compelled to rely.

If there are ideal proportions between the x-height and width of a letter and the thickness of its lines, those founts whose proportions most nearly approach the ideal will presumably be clearest. The ideal fount may perhaps be either bolder or lighter than the general run of founts now in use —there is no way of knowing. More probably, the consensus of opinion of successive type-designers may be taken to be a safe guide, and the clearest founts for all purposes are those which are neither particularly bold nor particularly light in relation to the majority of founts now in use for text composition. If then the typographer chooses to rely on the proportions calculated in appendix B, he will do well to use caution when dealing with founts at either extreme of the tables; a careful arrangement and reproduction of these founts will minimize their heterodox qualities.

For those who are learning to read, for elderly, short-sighted people, and for reading by dim light, bolder types are perhaps the best. For such

readers, speed of recognition is less important than the ability to discern every part of the letter.

§37 · SPACE

Among the most rigidly enforced conventions of book production is that which governs the over-all shape of the book—its format and thickness. This shape must be related to the classification of the book; for example, the squat, stout shape which is considered suitable for a dictionary might prejudice the sales of a novel. According to booksellers, the public is certain to balk at a book of unusual shape. Part of the designer's task, then, is to make every text, whatever its length, fit into a printed book whose dimensions approximate to those usual for books of the same kind.

The problem is sometimes acute in the production of novels, which are more limited in style of production than most classes of book. Most modern novelists write books of a length which can be fitted into something between 160 and 320 crown octavo pages, producing a book of conventional appearance, not so large as to look unlike a novel, nor so thick as to be intimidating, nor so thin as to seem meagre. Occasionally, however-particularly in America-a book of enormous length is written, and must somehow be presented in saleable form. Novel-readers are intolerant of small type; two or more volumes and two or more columns are said to be anathema, though these may be the only solutions consistent with good typography. The best solution, of course, is to give the reader the best whether he likes it or not; he has only to get used to buying novels produced in two columns and a quarto format—he will have no difficulty in reading them. The designer, however, may not always, or even often, be allowed to choose the best solution, but may be forced by the publisher and his sales adviser to use the smallest acceptable type in the widest practicable measure without any leading at all.

Usually, however, the problem is one requiring a less drastic solution. There are several courses which can be followed. Slight variations in page size, and particularly in width, may be possible; margins can be expanded or diminished; extra thin or thick paper may be used to compensate for a particularly large or small number of pages; leading, the arrangement of chapter heads and other variables can be adjusted. A right choice of series is only part of the means of making the text appear to contract or expand. Obviously a wide series will drive the text out to extra length, and a narrow series will economize.

The reader is concerned with the apparent size of the letters, not with their body. When a choice is to be made between founts from two or more series, the founts to be considered should be as nearly as possible equal in apparent size, as, for instance, a large x-height 10-point, a medium 11-point, and a small 12-point may be. To restrict the choice to three 11-points, one apparently large, one medium, and one small, and then to choose the most economical by looking for the narrowest set, might result in choosing for economy in width a letter which the reader would consider much smaller.

The most cogent factor of a fount's apparent size is its lower-case x-height; in appendix B, the widths in proportion to lower-case x-height of a number of 12-point founts are compared. The comparative proportions vary from fount to fount; in sizes below 9-point, for instance, Times is narrower for its x-height than either of the Plantin series examined, although in larger sizes Plantin is the narrower.

Different series will of course require different amounts of interlinear space (§ 82); nothing will be gained from choosing a fount for its narrow set if it requires extra lead—the line will contain more characters but there will be fewer lines on the page.

Exact adjustments of apparent size, whether for purposes of economy or not, can often be made by a change of series rather than of fount within series. A medium 11-point, for instance, may be intermediate in apparent size between the 11 and 12-point founts of a series which has a smaller x-height.

§38 ⋅ THE USE OF THE TYPE

The manner in which the type-face is to be used is also a major factor in its selection. The choice of a fount is dealt with in § 79, and the characteristics of the actual fount to be used will naturally influence the choice of series. Within a series the various founts may differ in character (e.g. § 50); and even if a certain fount would be suitable and has been cut, it may not be available at the chosen printing-office.

A careful matching of type-face with printing process and paper surface is always necessary. All type-faces are designed for the letterpress process (chapter 14), by which most books are printed; it is the oldest and still the pre-eminent method of printing. If, however, the printing number is a large one, the book designer may do well to avoid founts with thin hair-lines, in case at these vulnerable points the printing-surface eventually begins to wear away. For such long runs, stereoplates are often used (§ 131), and then there is a further risk that thin hair-lines will break down under the pressure used in stereotyping.

The choice of paper surface and type-face to suit each other is particularly important in letterpress printing. The principle of this process is that the printing surface touches the paper, and the non-printing surface, corresponding to the unprinted parts of the paper, does not. When the

printing surface, covered with ink, is pressed against the paper, pressure forces some of the ink outwards, towards and even beyond the edges of the printing surface. The resulting extra thickness of ink at the edges of the printed letter gives them a slightly hard, sharp appearance; they are outlined in a deeper black than the rest of the letter. Being forced outwards, beyond the area of contact between printing surface and paper, the ink thickens the printed image (figure 77, page 377). This thickening, known as ink squash, varies in extent according to the pressure used in printing, which depends in turn upon the nature of the paper surface. Very little pressure is needed to transfer ink to a hard, smooth paper, which touches all parts of the printing surface evenly, and therefore the printed image is only very slightly thickened by ink squash. On the other hand, increased pressure is necessary to transfer ink to all parts of the uneven surface of a rough paper, and increased ink squash results.

A very hard, smooth paper, therefore, such as art paper (§ 182), is best for letters which are thick in all their parts, and which need no further thickening by ink squash. There are not many type-designs of this kind; only a very few series, of which Plantin (§ 45) and Emerson (§ 71) are examples, appear at their best on art paper. Series whose letters have thick main-strokes and thin hair-lines, such as Monotype Bodoni number 3 (§ 63), can be effectively printed on a paper which is neither rough nor smooth, and which will strengthen the hair-lines a little without substantially increasing the thickness of the main-strokes. Series such as Times (§ 73), in which the main-strokes taper to sharp points at serifs and hairlines, but which do not have thin hair-lines of any length, and those series, such as Baskerville (§ 52), which have no particularly thick or thin strokes, are also suited to paper which is between rough and smooth. Letters which are thin in all their parts, as in the smaller sizes of Caslon (§ 50) normally used for text composition, need the extra thickening which results from letterpress printing on a fairly rough paper.

Thin hair-lines may also be a disadvantage if the text is to be printed by offset photolithography (§ 145). The ink is transferred to the paper by a rubber blanket, without enough pressure to force the ink outwards; and since the rubber blanket and the paper are in contact over nearly the whole of their surface, the area round the printed letter is closed between paper and rubber, and does not tend to receive ink squash (figure 77, page 377). Offset printing, therefore, does not itself tend to thicken the letter even in the slightest degree. The thickening which is sometimes seen to result from the process takes place during the photographic preparation of the printing surface; when surface plates are being made, light may spread slightly after passing through the transparent image of the letter,

and so thicken the printing image on the plate. In the making of deepetched plates from positive transparencies,¹ the tendency is the reverse; any spread of light between transparency and plate tends to reduce the thickness of the printing image, so that thin hair-lines may be further weakened by this process.

Photogravure (§ 149) is particularly unsatisfactory in the reproduction of type. The ink is contained in a diagonal pattern of tiny rectangular cells of equal size, etched into the surface of the printing plate or cylinder. This pattern tends to thicken the strokes, and to serrate their edges; at the same time, it may break up very fine lines (figure 77, page 377). The best types for use with the process, such as Monotype Old Style number 2 (§ 67), have no very thick or very thin strokes and are not very sharply cut in serifs or other details.

§39 · IMPONDERABLES

Besides those already described, there are other and more subtle factors in the choice of a type-face. The letters of a really good series must have a grace and rightness of form which can perhaps be identified only by the practised eye. The surest guide to the perception of this quality is an intimate knowledge of the construction of letters, which can best be gained by making them with care and precision. The practice of formal lettering with a chisel-ended nib is a short cut to that certainty of eye which every typographer should possess.

Throughout this book, printing is treated as a technique, or at most as a craft. This is partly because those activities in printing which approach the practice of an art have already been analysed by more expert hands, and partly because it is the practical parts of the work which must be mastered first. Far too much hand-made paper is wasted by 'fine' printers who are not even good printers; the intention of these pages is to describe the first steps, not the final achievements. The aesthetic side of printing is therefore touched on quite lightly, but it must not be neglected at any stage in book design, least of all in the choice of type. Here it may even have its practical value; a scientist² has recently stated that there is evidence that 'printed matter seems more legible, and reading becomes more accurate and quick, when the material is set in a type which the reader, perhaps without realizing it, finds aesthetically pleasing'.

The character or 'atmosphere' of a series is perhaps the finest point which influences the choice. Whether the letters are delicate or sturdy in appearance may be obvious enough; there are less obvious qualities of

¹ § 145.

² SIR CYRIL BURT: 'A psychological study of typography.'

detail, which can be perceived, but can hardly be described without recourse to a vague extravagance of language. To a limited extent the character of a series may be derived from its origin; and where there is a strong association between a book and a period or a country, a type deriving from that place or time may be a particularly suitable choice. Subtleties of this kind must, however, be weighed against practical considerations, and the choice of a series is primarily a practical task.

In the choice of a series, and indeed in book design generally, compromise cannot be avoided. Any typographer with a sharp eye and a critical faculty can point out flaws in the best of series. Any fount of type suitable for text composition can by definition be read without much difficulty, though some are naturally preferable to others in any circumstances. Every possible series, not merely the favourites of the moment, must be allowed to enter the field of choice, if more than a very few different kinds of book are to be composed; minor imperfections must not be supposed to disqualify.

In considering the imponderables of type-design, knowledge and taste are the surest guides. The achievement of these has been described by Daniel Berkeley Updike in an eloquent passage from *In the day's work*:

How is a man to arrive at a right selection of types? The answer is, by a mixture of knowledge and taste. This knowledge must come from a trained mind and experience. Where is the taste to come from? It may as well be admitted that some persons have no taste at all, but such persons would not be likely to try to produce a well-made book, or to know one when they saw it. Most men who go into printing have some sort of taste and a few an almost impeccable taste which is a gift of the gods. It seems to me that a right taste is cultivated in printing, as in other forms of endeavour, by knowing what has been done in the past and what has been so esteemed that it has lived. If a man examines masterpieces of printing closely, he will begin to see why they were thought masterpieces and in what the mastery lay. He will perceive that all great printing possesses certain qualities in common, that these qualities may be transferable in some slight degree to his own problems, and then he will find himself braced and stimulated into clearer, simpler views of what he can make out of his task. When he sees the books that have delighted all generations and begins to comprehend why they were great pieces of typography, he is beginning to train his taste. It is a process which once begun is fed from a thousand sources and need never end.

BOOKS

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 at the request of the Syndics by Bruce Rogers and now printed in honour of his eightieth
 birthday Cambridge University Press, privately printed, 1950: not for sale type
 examples.
- See also, after chapter 1, JENNETT, SIMON, and UPDIKE (Aspects of printing); and, after chapter 5, GOUDY and THOMAS.

Text types

This chapter contains specimen settings of founts from most of the typeseries now in general use for bookwork text composition in Great Britain. The specimens are set in various sizes.

The title of each specimen includes the name of the machine for which matrices of that particular series were made. Some series are available with two or three machines, and these series are identified within the specimen of each. The Plantin specimen is headed MONOTYPE PLANTIN, for instance, but this is not intended to deprive Linotype & Machinery Ltd and Intertype Ltd of credit for their versions of the same series; the original face, however, was designed for the Monotype. There are obvious differences between two or three versions of the same face, but they are not always so marked as to cause different versions to be considered as separate series for the purpose of this chapter.

Most of the series shown here were cut by the Monotype Corporation, and this is due to that company's leadership between the wars in the design of type for text-setting. Linotype is also well represented, having produced a number of original faces. The Intertype range, though not represented here, may also be found useful, since it includes a variety of composition faces.

The origins of the design of the various types are described in some detail, so that this chapter provides a brief account of the development of the roman and italic letter for printing. (The type-faces used in this chapter should by no means be supposed to be exact reproductions of the faces from which they are derived.) This historical description of each series is followed by a note of any of the dimensions of the 12-point fount which may be considered at all out of the ordinary; dimensions on which no comment is made may be considered to be unexceptional. When read in conjunction with chapters 7 and 9, the note on the dimensions of the letters should offer some guidance as to how that fount, and perhaps the series of which it is part, may best be used. The reader must, however, remember that the qualities of the 12-point fount are not necessarily those

¹ The data on which the comments are based appear in appendix B.

of the rest of the series (figure 14). As for the appearance of the letters, that can speak for itself.

Caslon Caslon Caslon

FIGURE 14. From left to right, 72, 48, 24 and 8-point Caslon, enlarged or reduced to approximately the same x-height, to show differences in proportion and style.

The founts of which each series consists are shown in appendix C. These figures were correct at the time of going to press, but as the speed of matrix production increases they will become more and more out of date.

It is of course with the roman upper and lower-case that the greater part of each specimen is concerned, but the character of the auxiliary characters and alphabets is also of interest. Chief of these are the italic alphabets; a sentence or two is set in the italic upper and lower-case of any italic worth noting. Small capitals appear in the heading of each specimen. If the series is equipped with a mated bold or with other variants for text composition, the variants are mentioned, and the bodies on which they are available also appear in appendix C. A limited number of swash letters and other special sorts are available for use with many series, but they are mentioned only if an unusually comprehensive range exists.

The classification of type-faces is sometimes a delicate matter, since not everyone is agreed on the definition of each class. Some typographers do not in fact agree that type-faces need to be classified, believing that classification is apt to lead to futile generalizations about the qualities and treatment of large groups of widely differing series. Certainly the names of the classes are misleading; the types which are more widely used today are 'old faces', and the now unpopular 19th-century designs are known as 'modern'. The names of the different classes are, however, often referred to, and—for information rather than for action—each is defined in this chapter.

Unless otherwise stated, each series is provided with roman and italic figures of appropriate design—that is, hanging figures for §§ 40–58 and lining figures for §§ 59–66. The figures provided for old style and contemporary series, §§ 67–76, are described.

§40 · MONOTYPE CENTAUR (SERIES 252)

The roman letter as we know it was not originally designed by printers, but was adapted by them from the calligraphy used in many 15th-century manuscript books in Italy. The process of adaptation was rapid and skilful, and was completed within a quarter of a century after the

European discovery of typography. By 1470 Venetian punch-cutters among others had cast off the last influence of Gothic letter-design, and were producing pure roman letters for the printer. Their early roman types, designed in the style of the calligrapher but for the printer's use, are now known as 'venetian' types; the letters were wide and strongly drawn, with tall capitals, bracketed slab serifs, oblique shading, and a distinctively slanted cross-stroke in the e.

The best of venetian romans was brought into use by the printer Nicolas Jenson of Venice in 1470, and is still generally admired as one of the finest of all type-designs. Some four and a half centuries later the letters were copied by Bruce Rogers, the eminent American typographer, and in 1915 they appeared in a more delicate and less robust form in a pamphlet entitled *The Centaur*. Rogers adapted his own design for machine composition, and the Monotype version was produced in 1929.

Both upper and lower-case letters are very lightly drawn, with open counters and fitting; the lower-case is particularly small on the body (small in x-height in proportion to the body), and has unusually long extenders. In the founts below 12-point the design is not seen at its best, since the letters are small and light; the grace of the individual letters is more evident in the larger sizes. Light, sharp, and spacious, the series requires particular care in choice, arrangement, and presswork. Never having been widely popular, Centaur remains unhackneyed for special use.

Italic types did not come into use until after the end of the 15th century, and an italic for use with Centaur roman had therefore to be found in a later period of printing history. Centaur italic, also known as Arrighi, is an adaptation for machine composition of a copy by the late Frederic Warde, the American typographer, of the first of the two major founts designed by Ludovico degli Arrighi. From about 1510 Arrighi was a professional calligrapher employed in the Papal Chancery; and when in 1523 he designed his first fount, he based it on the formal chancery italic used for the engrossing of papal briefs. The characteristics of this kind of italic were the narrow set, the particularly long extenders (the ascenders being sometimes flourished), the upright capitals which were sometimes swash in style, and the slightness of the slant. Arrighi's type-design was derived directly from handwriting, and it is therefore a particularly suitable mate for a revival of Jenson's roman. Not all the characteristics of the original are reproduced in the revival.

There is also a boldly handsome titling fount (series 295) in 60-point only.

§ 41 · MONOTYPE BEMBO (SERIES 270)

Aldus Manutius was the leader of the next generation of Venetian printer-publishers. Early in 1495 he brought into use a new roman fount, cut by his punch-cutter Francesco Griffo, and first used in a pamphlet by a young scholar named Pietro Bembo. Aldus became the father of modern book production; a scholar as well as a printer, he was the first to publish well-edited and well-printed books for the many, and to make extensive use of such economies as octavo formats and narrow-set type. Later he introduced the first of all italic types.

His roman of 1495, then, was much narrower than that of Jenson, and more regular in appearance; the capitals (which belonged to another fount) were narrower and less tall in comparison with the ascending letters. The sharp contrast between thick strokes and thin was perhaps unsuitable for the foundry techniques and press-work of the time, since such sharpness did not reappear in roman types until the next century. Without loss of grace, this roman achieved a legibility equal to that of Jenson's, and a good deal more economy. Aldine romans were copied all over France and Italy during the 16th century, and are the origin of all the many romans now classified as 'old faces' (§§ 41-51). Among the more obvious characteristics of this kind of roman letter are oblique stress and oblique top-serifs; old faces may be distinguished from venetians, with which they share these characteristics, by the horizontal cross-stroke of e. The Monotype Corporation's conspicuously successful adaptation, with lightened and regularized capitals, appeared in 1929.

All the founts down to 8-point are good; below 8-point, Bembo is at least clear, and not more distorted than other designs in these difficult sizes. The proportions of the letters are pleasant; the capitals are rather low, and the lower-case letters are small on the body.

The first italic was a new chancery, Bembo Condensed Italic (series 294), designed by Alfred Fairbank, the calligrapher. This narrow and slightly inclined series was found to be too individual to serve as an auxiliary to the roman, and now appears from time to time with better success as a text type in its own right.

The replacement, Bembo Italic, was based on chancery types used, and probably designed, by Giovantonio Tagliente, a great writing-master who practised in Venice from 1524. Tagliente's chancery, like that of Arrighi, needed extensive revision for machine composition in company with roman.

The bold roman, Bembo Bold (series 428), is better than most of its kind; bold types as a rule are useful but unpleasing—this is one of the more pleasant designs. Bembo Titling (series 370) is light, sharp, and

graceful: it is cut in large sizes only, and there is an unusual italic titling in 42-point. The standard figures of series 270 are hanging, but lining figures are also available.

§ 42 · MONOTYPE POLIPHILUS (SERIES 170)

In 1499 Aldus published one of the most famous of 15th-century illustrated books, the *Hypnerotomachia Poliphili*. The lower-case roman used in that book was a re-cutting of the roman of the Bembo tract, strengthened perhaps to harmonize with the woodcuts used for the illustrations. In 1923 the Monotype Corporation brought out a fac-simile revival, faithfully copied from the printed original with all its apparent irregularities.

Poliphilus is a particularly bold and narrow design, with no fragile hair-lines. The counters are small and the letters closely fitted, so that they are seen at their best when reproduced in a manner which does not thicken the strokes. The range of the series is limited, since there are only five founts of roman upper and lower-case, from 10 to 16-point, and two large sizes of titling (series 230).

The italic is known as Blado (series 119). Antonio Blado was probably one of the best, and certainly one of the longest-lived, of Roman 16th-century printers, since he worked from 1515 to 1567. He was a connection of Aldus, and a Lombard like Arrighi. Arrighi seems to have lost his life when Rome was sacked by mercenary armies in 1527, and a few years later Blado, who had already been associated with him, began to use the second and less elaborately flourished of Arrighi's founts, which had first appeared in 1526. Monotype Blado is copied from this fount. The series is available for use not only with the roman Poliphilus founts, but in 24-point, a fount which is particularly useful for display.

The main strokes of the small capitals are actually thinner than those of both the roman and the italic lower case. Alternative lining figures are available.

§43 · LINOTYPE ESTIENNE

The high reputation of the Aldine press among scholars was equalled by that of the Aldine roman among printers. A roman similar to that of the Bembo was produced by Claude Garamond of Paris, the first of all type-founders to set up a foundry of his own, not dependent on any one printer.

Chief among the many printers who used types supplied by Garamond were the Estiennes of Paris, the leading printer-publishers in France during the late 15th and early 16th centuries. This Linotype face was designed by the late George W. Jones, and was first used in 1930.

Although named after the Estiennes, it is said not to be a direct copy of their types so much as a design in the style of that period. It is, however, very similar to the large roman, almost certainly cut by Garamond, which appears in the preliminary pages of Robert Estienne's Folio Bible of 1532. If Linotype Estienne was designed in the style of such a large fount (actually gros canon, or about 44-point), that would account for the unusual length of the extenders.

Estienne is extremely small on the body, with particularly tall capitals. The italic, apparently copied from an early fount cut by Robert Granjon, is rather loosely fitted. In some of the roman and italic founts, ligatures are available which provide a fully kerned f. Alternative lining figures are available.

§44 · LINOTYPE GRANJON

Type-founder, printer, and publisher, of Paris, Lyons, and Rome, Robert Granjon was a pupil of Garamond and another heir of the Aldine tradition of letter-design. The fame of Garamond rose from his roman types, that of Granjon from his italic. Granjon's first italic founts, though derived from those used by Blado, were more steeply slanted, larger on the body, and rather wider. The capitals also were slanted, and in general his designs were among the fore-runners of the now familiar old face italic which accompanies most roman old faces. Italics of this kind were, however, originally designed as type-faces in their own right rather than as auxiliaries to roman. This roman, however, designed by George W. Jones and produced by Linotype in 1925, is connected with Granjon only in name. It was drawn in the style of Garamond's roman types; the fount which served as a model, a 16-point (approximately) used by Jean Poupy of Paris in 1582 for Bouchier's Historia Ecclesiastica, was cut by Garamond, and appeared ten years later under his name in the now famous specimen of Conrad Berner's foundry.

The larger Granjon founts are among the most handsome of those peculiar to the Linotype; the series is particularly admirable in 12-point and above, the smaller sizes being rather thin. The italic, like that of Estienne, is too loosely fitted to be attractive. The mated bold is called Bernard, and might more accurately be described as a semi-bold. Granjon is also equipped with a number of swash and special sorts, and with a wide range of ligatures from which the fully kerned f and f can be produced. These are attractive when they can be used, but their insertion by hand retards the keyboard operator and increases the cost of composition. There are ranging figures of four kinds, as well as old face figures, and more than thirty ornaments specifically designed to match the series.

§ 45 · MONOTYPE PLANTIN (SERIES 110)

Christophe Plantin, a Frenchman, began to print and publish at Antwerp in 1555, and, in spite of a series of disasters inflicted on him by the violence and intolerance of the time, built up one of the best-equipped presses in Europe, producing books in many languages and achieving international fame. Plantin's press and his equipment survive almost intact, as the Plantin-Moretus museum in Antwerp—a complete 16th-century printing office, ready for the day's work.

Monotype Plantin was adapted in 1913 from a fount in the Plantin office which was bought after Plantin's time. The cutting of the series was something of a venture; the makers of composing machines had not until that time taken the initiative in the production of a new type-series. The design itself was original, since it was not a copy but an adaptation for 20th-century use; extenders were cut short for close setting, and the main-strokes and other parts of the letters were strengthened for use on art paper and with alternative processes.

The original series 110 became the nucleus of a type-family, consisting of roman and italic founts of different weights based on one design. Plantin Light (series 113) is particularly suitable for bookwork, being more open than the original series, which is unusually dark; special long extenders are available for use with either series. There are also Plantin Bold and Bold Italic (series 194), Bold Condensed (series 236), and a Titling (series 438).

Plantin number 2 (series 281) is cut to range with German types, and so is even bolder and larger on the body than series 110. It has been cut in two composition founts only.

The narrow set of series 110—and for its x-height it is narrower and more closely fitted than almost any other in general use—is a great saver of space. The strength of every part of every letter makes it particularly suitable for use on art paper, for stereotyping, and for printing by offset and gravure. The extremely short extenders enable the lines to be crowded closely together in narrow-measure setting. The letters are very large indeed on the body, and the capitals unusually small in proportion to the short letters. The design is seen at its best in 12-point and below; the larger founts have rather a clumsy appearance. The italic has characteristics similar to those of the roman. Alternative lining figures are available.

Linotype and Intertype both have their versions of the same series.

¹ It is reproduced as figure 1 by A. F. JOHNSON in his Specimen books of Lamesle and Gando (Bibliograpical Society, 1937).

The Garamond series was the first in the ambitious programme of matrix production undertaken by Monotype in 1922. The corporation had already shown itself aware that the single-type machine could be

used to produce letters of better design than could the line-casting machine, and that in this sense the Monotype was the descendant of the old type-foundries. In 1922 the corporation engaged as adviser Mr. Stanley Morison, one of the most eminent of typographical scholars and historians, and soon began to lead the rest of the world in the revival of classic type-faces. Planned and supervised by Morison, its great programme has already produced the most popular book types of today, whether revivals or contemporary designs, and has resulted in a general preference for the Monotype among book-designers in Britain.

Until 1926 the series known as the Caractères de l'Université, some ancient matrices of which survive in the historic Imprimerie Nationale¹ in Paris, was supposed to have been cut by Garamond. The Monotype Corporation's revival of the series, produced in 1922, was naturally called Garamond. Four years later, however, Mrs. Beatrice Warde found that the earliest founts of the Caractères de l'Université were in fact cut by Jean Jannon of Sedan, and shown in his specimen of 1621, more than fifty years after the death of Garamond. Jannon, at the outset of his career, used Garamond types, and although he based his design on them it was new in several ways. Garamond's letters were strongly drawn in every part, with stubby serifs, to stand up to the wear of 16thcentury printing methods and paper surfaces. Jannon's design is much rounder, lighter, and more open; particularly sharp top-serifs disfigure some of the letters. The capitals are conspicuously heavier than the lower-case letters. In the smaller founts, however, the open counters impart clarity to the letters, and the faults of the design are much less obvious. Alternative lining figures are available.

The italic now used with the Caractères de l'Université appeared to Morison to be inferior to the roman and not to belong to it. For an original for the italic re-cutting, therefore, he turned to a gros canon italic cut by Granjon, which had appeared in the repertory of the Imprimerie Royale earlier than the rejected fount. Granjon practised as a punch-cutter from about 1545, and Morison believes that the Imprimerie Nationale's italic was cut before 1560.

The letters are conspicuously irregular in slant, as well as being steeply inclined, so that they are decorative but restless in appearance. The capitals vary too obviously in angle to be composed together, unless a consciously archaic effect is intended. Compared with the roman, the italic is very thin in main-stroke.

There is, however, an alternative fount, Garamond Italic number 2 (series 174), which is more regular in slant. Following the original, both italics are equipped with a remarkable range of swash letters and ligatures, some of which appear on the opposite page.

The series also has a mated bold and bold italic (series 201). There

1 Until the Revolution, the Imprimerie Royale.

ABCDEFGHJMPTU NaNeNiNoNu RaReRiRoRu QUQuQu Ex Ukasis us stata et spvzemnt

are Linotype and Intertype versions of the design, differing slightly from that produced by Monotype. Special long descenders and special duplex roman and italic small capitals are available for use with the Linotype series.

§ 47 · MONOTYPE VAN DIJCK (SERIES 203)

Christoffel Van Dijck of Amsterdam was the leading letter-founder of his period, the middle years of the 17th century. Types believed to be his were used in England by the University Press, Cambridge. As Garamond's roman overshadowed all others during the 16th century, so did that of Van Dijck excel those of the 17th. Some critics consider Van Dijck's types to be a close copy of Garamond's, and so to maintain the Aldine tradition of roman type-design.

Much of Van Dijck's material was bought after his death by the historic firm of type-founders and printers, Enschedé en Zonen of Haarlem, and most of it was destroyed there during the 18th century. Since no specimen of Van Dijck's own has ever been found, no attribution of a particular roman design to his hand can be certain. A large italic fount, however, punches of which survive at Enschedé, was identified as one which appeared on a specimen sheet produced by a house known to have bought some of Van Dijck's material, and was therefore considered to be his work. The Monotype Corporation's Van Dijck design was to have been based on this italic and on the roman which accompanied it on the specimen. In preparing the design, the corporation was advised by Jan van Krimpen of Enschedé, the famous designer of types and books.

Van Krimpen came to doubt whether the roman and italic were in fact from the same hand, and indeed whether either had been cut by Van Dijck. He kept to the design of the italic, however, and after a search discovered a roman which he considered its true mate. This roman appeared in a translation by J. van Vondel of Ovid's *Metamorphoses* (Amsterdam, 1671), and is the original of the Monotype series. Neither roman nor italic of this series, then, can confidently be ascribed to Van Dijck; and the types of the best designer of the 17th century, as of the 16th, may never have been faithfully copied for machine-setting. The Monotype series was produced in 1935.

The letters are rather small on the body, and very narrow, in the text

sizes; the capitals are small, but rather heavy for their size compared with the lower-case. The larger composition founts, particularly the 13 and 14-point, are perhaps more satisfactory than the smaller sizes, which are a little thin. Special short descenders are available, but they tend to deprive the design of its character.

The italic—narrow, light, and rather steeply inclined—is similar in style to Granjon's (§ 46). Like his, the capitals are particularly irregular in slant, and since some of them are also archaic in form, they should not normally be composed together. The small capitals are particularly strong and clear. Alternative lining figures are available.

§48 · MONOTYPE EHRHARDT (SERIES 453)

In Germany, meanwhile, the tendency in roman type design was towards dark narrow letters, very closely fitted, perhaps as a result of the spreading use in that country of a form of black letter. Some of the romans of this kind used by German presses towards the end of the 17th century were considered to be Dutch, and some Dutch punch-cutters were certainly producing rather similar letters. Later the style became known as the goût hollandois.

Among the first punch-cutters to design letters of this kind in Germany was Anton Janson (a Dutchman) of Leipzig, who printed a specimen in 1672. His work was improved on, and a better roman of the same kind appeared in a Florentine book of 1691, and again, with an extensive range of similar founts, in the specimen sheet of the Ehrhardt foundry, also of Leipzig, perhaps in 1739. The precise origin of the Ehrhardt founts is not certain, but Mr. Harry Carter suggests that most of them were cut by Nicholas Kis, a Hungarian, who left them in Leipzig for sale in 1689. In 1938 Monotype produced a regularized version of one of the romans in the Ehrhardt specimen—apparently from one of the two founts which approximate to 14 and 18-point.

The letters are particularly narrow and closely fitted, rather dark and fairly large on the body; the extenders, however, are of adequate length. There are at present seven composition sizes, and there is no italic in the display founts. The italic, like the roman, is regular in form, narrow and closely fitted. There is a mated series, Ehrhardt semi-bold, series 573.

\$49.LINOTYPE JANSON

The founts shown in the Ehrhardt specimen survived, and the original matrices are still in use at the Stempel Foundry at Frankfurt. In the course of 200 years they have become attributed to Janson, and are still known by his name; they are, however, considerably better than any work

known to be his. The Linotype revival of the so-called Janson founts, produced in 1934 in America, was adapted by C. H. Griffith from type cast from the 14-point Stempel matrices.

Unlike Ehrhardt, Janson is of medium width, and is rather large on the body. It is available in six founts, from 8 to 14-point; alternative long

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

descenders and special roman and italic small caps are available. Uncomfortable details of certain italic letters—particularly m n and u—are copied from the original. The small capitals are particularly strongly drawn; alternative lining figures are available.

§ 50 · MONOTYPE CASLON OLD FACE (SERIES 128)

Harried by restrictions imposed by successive governments and sovereigns, British typefounders produced few, if any, designs of lasting value until the 18th century. Great quantities of matrices and types were imported from Holland, and Dutch types were in general use among British printers; English letter-founding was almost at a standstill.

Although the stringency of the censorship was relaxed towards the end of the 17th century, the lull in punch-cutting continued for some years. Early in the 1720's William Caslon of London began to cut roman and italic letters in the style of some of the Dutch founts then in use in Britain. These were either Van Dijck's, or copies of his designs, and Caslon followed them so closely that Updike confused a Dutch fount with one cut by Caslon.¹

Caslon's roman has perhaps suffered from an excess of adulation. The well-read layman has heard of Caslon if of no other founder; Bernard Shaw and T. E. Lawrence, for instance, both insisted on Caslon's types for their books, though Shaw lived long enough to learn that another series might serve him better. Caslon was the first of the really able British type-founders: his types made British printers independent of foreign material, and initiated a great era of British typography: his fame and his two best founts assisted the revival of decent printing in the dim years of the 19th century: his punches and matrices are still in use—and all this has perpetuated his reputation.

The fame of Caslon's types, however, has outlived the general admiration for them from which it grew. In 1917, for instance, Bruce Rogers expressed an unfavourable opinion: 'It is, I have

A. F. JOHNSON: On re-reading Updike (Alphabet and Image, September, 1946).

² In his Report on the typography of the University Press, Cambridge, 1917.

long thought, a much over rated type. . . . Its chief faults are the clumsiness and crudeness of certain letters, and, in some sizes, a too open set, i.e. too much white space between letters.' Stanley Morison has written in similar terms: 'the historic "Old Face"... of Caslon is in no way superior to the finest founts of the Amsterdam houses; neither does it compare favourably with the best of Garamond or of Granjon, nor, indeed, is it any advance upon the Aldine archetype of 1495. In the Pica, some characters . . . are in fact amateurish, and the italic throughout is certainly inferior to the best of the continental products. As a series the fount form is not well graded. . . .' From the comparative rarity of Caslon types in exhibitions of British book design from 1945 to 1955, it would appear that most typographers agree with these strictures. These exhibitions are not of course strictly representative of the country's output, but they probably give a fair idea of the general trend.2

One reason for this may be that there is something in the Caslon designs which so far has baffled the draughtsmen who have adapted them for mechanical composition. None of the three machine-set versions does justice to the original, and the quality of the series is best judged from types cast from the original matrices, in the possession of Stephenson, Blake & Co. Variation in design between founts is the most conspicuous characteristic of the series as a whole; for purposes of criticism, however, the founts may reasonably be grouped together to some extent.

The largest founts, down to 22-point, are bold and well-rounded. In letters of this size, grace of form is very nearly as important as any other quality. Such letters are rarely used for sustained reading; they are intended to be looked at almost as much as to be read. Caslon's larger founts, however, are conspicuously lacking in grace, though strong and clear. The canon (approximately 48-point) was cut not by Caslon but by or for Moxon, and belongs to the 17th century.

The middle founts, great primer (approximately 18-point) and english (approximately 14-point), are quite the best of the series. If Caslon had cut no other founts, the esteem for his work which is so indiscriminately expressed would be better deserved. The

¹ In his preface to Catalogue of specimens of printing types by English and Scottish printers and founders, 1665–1830.

² 823 books have appeared in these 11 exhibitions. 169 were set in Bembo, 115 in Baskerville, 68 in Times New Roman, 51 in Fournier and in Imprint, 49 in Perpetua, 43 in Walbaum, 35 in Garamond, 34 in Bell, 30 in Plantin, 29 in Poliphilus, and 26 in Caslon. The remaining 123 books were set in 30 less frequently used types.

proportions of the letters are admirable and their form satisfactory. Caslon's other founts are considered to be copies of contemporary types, but if these are copies the originals have not been traced. It was on the use of these two founts that William Pickering and Charles Whittingham based their revival of book-design in the mid-19th century.

The earliest of Caslon's roman founts, the pica (approximately 12-point), appeared in 1725, and is the least satisfactory of them all. The strictures of Bruce Rogers, quoted above, can be aptly applied to this fount in particular. In addition, the letters suffer from a lack of contrast in the shading, which deprives them of grace. The main-strokes are thin, and need the enlargement caused by a firm impression into a fairly soft, rough paper. The looseness of fitting, which now disfigures types cast from the original matrices as well as copies, is not evident in Caslon's own specimen of 1733; it is likely that the fount would benefit from being cast on a slightly narrower body.

Some of the faults of the pica appear in the smaller founts, though to a lesser degree; the quality of these varies, and attractive use can be made of one or two of them. In precision of cut they fall far short not only of some of the French and English faces of the later 18th century, but of some French faces of the 16th century.

The capitals in all the founts are less handsome in their proportions than some much earlier capitals such as Jenson's, and in addition are particularly heavy in comparison with the lower-case.

The italic is steeply inclined, unusually light of stroke in proportion to the roman lower-case, and equipped with a considerable range of swash capitals. Bold faces of later design are available for use with the original founts and with the versions produced for all three composing machines, and there is a Monotype Titling (series 209).

By the end of the 17th century the old face tradition of roman type design, begun by the Aldine founts and carried on by those of Garamond and Van Dijck, was already petering out. In Caslon's work it appeared almost for the last time, and by no means at its best.

¹ The Riverside Press in America has a version of Caslon cast in this way; it bears a striking resemblance to Monotype Van Dijck.

§ 51 · MONOTYPE OLD FACE SPECIAL (SERIES 20)

This series, originally known as Caslon Old Face Special, is a regularized version of some of the Caslon founts, with some of

the same faults and virtues. Some printers still display it in their specimen books as Caslon. The letters are rather more regular than those of the smaller Caslon founts, and the shading is more clearly marked, but the same meagreness of main-stroke and looseness of fitting is evident in some sizes. The capitals are particularly bold and tall in comparison with the attenuated lower-case; in general, the design is particularly light and open. The range of founts is limited, since no sizes above 12-point have been cut. The italic is similar to that of Caslon. Upright figures only are available.

§ 52 · MONOTYPE BASKERVILLE (SERIES 169)

The impetus of the Aldine tradition of type design having died away, typefounders had to look elsewhere for inspiration. The only other influence in existence was that of calligraphy, and the next famous letter produced in Britain came from the hand of a writing-master.

John Baskerville of Birmingham formed his ideas of letter-design during his early career as a writing-master and engraver of inscriptions. Having made a fortune in japanning, he retired in middle age, set up a press of his own, and produced his first book in 1757.

His letters were based on forms which had been current among professional calligraphers since before Caslon cut his first punch. The Aldine types were based on the caroline minuscule, a comparatively narrow and rapid handwriting, for which the pen was held diagonally to the lines of writing, giving the letters a diagonal stress. But the caroline letter had been preceded by a rounder and more formal hand, the uncial and semi-uncial, for which the pen was held pointing straight up the page. Now that handwriting was less used for sustained work, formality and display returned to penmanship, and brought with them the older method of handling the pen. In the 'round hand' of the early 18th century the stress was vertical, but top-serifs were drawn obliquely, in imitation of printed letters. Type-faces which in the same way retain some characteristics of old face, particularly in the serifs, while using the 'modern' vertical stress, are known as 'transitional' (§§ 52-57).

Baskerville's roman, then, was wide and open, with the vertical stress of the writing-master. His italic was designed expressly as an auxiliary to the roman; the letters were wider, more evenly and less steeply inclined than those of old face italics, so as to combine better with roman. Some of the italic capitals have a writing-master's flourish which gives them an uncomfortable appearance when composed together.

The Monotype Corporation, which, like other punch-cutters, was perhaps less than fair to Caslon, did more than justice to Baskerville, copying his great primer fount in a more regular form, and tightening the fitting. The series was completed in 1923.

Monotype Baskerville is rather wide-set for its x-height, but the letters are closely fitted enough to be economical; for its x-height, 12-point Monotype Caslon is more extravagant laterally, due to its looser fitting. Because of the excellent proportions of the Baskerville letters (in particular the relation between thickness of stroke and size of counter) and the close fitting, this is one of the most readable and pleasant designs now in use. Baskerville designed his letters with the intention of leading them, rather than setting solid in the usual old face manner, and like all vertically stressed letters they benefit from leading. The most conspicuous fault of the design is that the capitals, though not particularly tall, are substantially heavier than the lower-case letters. Alternative lining figures are available.

Special long extenders are available for use with the 11 and 12-point founts, but the ordinary extenders are quite adequate. There is a mated bold (series 312) and, in 11-point, a bold italic, as well as various large bold titling founts intended for newspaper headings.

§53 · LINOTYPE BASKERVILLE

Baskerville's work was admired more widely on the Continent than at home, and after his death his punches and matrices were bought by Beaumarchais for an edition of Voltaire. Some of this material survives (now at the University Press, Cambridge), and the Linotype series, first brought into use in 1931, is a facsimile revival copied from the english fount cast from Baskerville's own matrices. The Linotype letters are rather more strongly drawn than those of the Monotype, but the capitals are very much smaller and lighter in proportion to the lower-case. Alternative lining figures are available.

There is also an Intertype version, closer to the Monotype design than to the original.

\$54 · LINOTYPE GEORGIAN

The Baskerville style of type design had its effect on British letterfounders of the later 18th century. Among the foundries which produced types in this style was Alexander Wilson's Glasgow Letter-Foundry, which produced its first specimen in 1772. George W. Jones copied one of the Wilson designs, regularizing it slightly in the manner of 18th-century engraved letters; the new series, named Georgian after the period from which it derived, was produced by Linotype in 1931. (This series should not be confused with an 18th-century roman by Fry, later called Georgian and now in the possession of Stephenson, Blake.)

Generally the series is similar to Linotype Baskerville, though a little lighter and more open, smaller on the body and not quite so wide-set. Alternative lining figures are available. There is a range of ligatures intended to give the letter f in roman and italic the appearance of kerning, and a number of swash letters for the italic founts. The mated bold, Victorian, is a semi-bold of unusually good design.

§ 55 · MONOTYPE BULMER (SERIES 469)

Baskerville's foreman, Robert Martin, had a brother William, who may have learned how to cut punches at the Baskerville Press. William became well known as a punch-cutter, and prepared the types for the monumental 'Boydell Shakespeare', printed by William Bulmer in 1792. Martin's roman showed a much sharper contrast between thick strokes and thin than the types already shown here, and the top-serifs were unsupported by brackets. The emphatic weight of the main-strokes may have been designed to suit the new technique of wood-engraving, recently introduced by Thomas Bewick, or it may have been suggested by continental developments described later in this chapter. The design was introduced in 1937 for the Nonesuch Press edition of the works of Dickens, and is available only in 11 and 12-point. Lining figures only are available.

§56 · LINOTYPE CALEDONIA

This series is a 20th-century design by W. A. Dwiggins, the well-known American typographer. It is so named because he began by trying to adapt a modern face (§57), described later, known as Scotch Roman. Dissatisfied with the result, Dwiggins turned to Martin's roman, and produced this new design based on Scotch and the earlier type. The series first appeared in America in 1939.

Caledonia is rather a dark face, but not excessively so, because of the length of the thin hair-lines which extend well into that part of the stroke usually thickened by shading. The capitals are commendably low, and the short letters are large on the body. Alternative long descenders are available. The italic letters are wide, and avoid the looseness of fitting which mars some slug-cast italic founts. Lining figures only are available.

§57 · MONOTYPE FOURNIER (SERIES 185)

While the development of type-design in Britain during the 18th century had been influenced by calligraphy, French designers had been guided by a type-face of a new kind.

For the first fifty years of its existence, the Imprimerie Royale, founded in 1640, had been using conventional 'old faces', including founts cut by Jannon. Towards the end of the 17th century a new series of roman and italic founts was commissioned for the exclusive use of this press. The design was not left to the punch-cutter but was drawn for him by a committee of the Académie des Sciences. The committee, carried away by enthusiasm for principles of symmetry, produced a remarkable design. In order to give the letters an appearance of balance, the shading of all letters was vertically drawn. Because some foot-serifs were horizontal and extended to the right as well as to the left of the main-stroke, the top-serifs of ascending lower-case letters were treated in the same manner; all the other top-serifs were naturally drawn horizontally.

Le Specimen de l'Imprimerie royale se divise en deux parties, sous la dénomination d'Ancienne et de Nouvelle Typographie.

L'ancienne Typographie comprend les caractères français et exotiques; les vignettes, armes et fleurons, gravés à diverses

FIGURE 15. The romain du roi of 1702, cut by Grandjean.

Vertical stress and horizontal top-serifs are the main characteristics of the design now known as 'modern face' (§§ 58–66). That the Imprimerie Royale's new series, known as the *romain du roi*, is considered to be the first modern although cut 250 years ago, indicates the absurdity of the term.

Other characteristics of the *romain du roi* were the regularity of the slope of the italic and its affinity for the roman; unlike old face italics, it was designed expressly as an auxiliary, and was not derived from italics intended for text composition by themselves. The new design, however, retained certain old face characteristics, such as the lack of sharp contrast between thick and thin, and the cursive beginning-strokes in ijmnp and r. In a later version, cut by Louis Luce, these beginning-strokes began to take on the appearance of serifs.

No copying of the *romain du roi* was permitted, but its influence on French punch-cutters was obvious. One of the most famous of these was the Parisian founder Pierre Simon Fournier, also known as Fournier le Jeune, since he was a member of a family of eminent craftsmen. Fournier studied the work of his contemporaries and predecessors, and their influence appears in his designs. The *goût hollandois*, of which the Ehrhardt series was an example, had undergone the refining and enfeebling influence of the well-known punch-cutter J. M. Fleischmann, and Fournier derived the proportions of some of his thin, narrow romans from Fleischmann and from Luce's version of the *romain du roi*. From Luce's roman he also copied the vertical,

or almost vertical, stress of some of his letters. An innovation was the use of top-serifs, like those of the roman, instead of beginning-strokes in ij m n p and r. As in old face, all top-serifs remained oblique, so that the design can hardly be said to be either old face or modern. The Monotype Corporation produced a facsimile version of one of Fournier's romans in 1925; the originals were the St. Augustin Ordinaire, numbers 46 (roman) and 47 (italic) in his Manuel Typographique (1764–6).

The design is light and open, and the letters are fairly narrow. The capitals of series 185, the generally used series, are particularly tall and bold in proportion to the lower-case, and series 285, which has shorter and lighter capitals, was cut for the first Nonesuch Press Shakespeare. The italic, influenced by the handwriting of the day, is decorative, and has unusual figures—1234567890.

¹ In A tally of types, Mr. Morison describes the remarkable mistake by which this Fournier revival was cut instead of another based on a heavier design, now known as Monotype Barbou and not generally available.

§ 58 · MONOTYPE GOUDY MODERN (SERIES 249)

The influence of the romain du roi affected not only printing types but other kinds of letter. In an edition of Ovid's Metamorphoses, printed in Paris in 1767, the caption to one of Gravelot's engravings was drawn in a delicate open letter, in which the horizontal top-serifs and vertical stress of the royal type were combined with unusually low capitals and bracketed serifs. One of these illustrations with its caption was reproduced by Alfred Pollard as the frontispiece of his Fine books (Methuen, 1912). F. W. Goudy, the American type-designer and printer, redrew the reproduced letters, and called his version Goudy Open; when he saw the first proofs, he filled in the open space within the strokes, produced a solid version of the same letter, and called it Goudy Modern. This first appeared in 1918, and was recut by the Monotype Corporation ten years later.

The letters have a slight eccentricity of appearance in mass; this has prevented the series from becoming popular for text composition, but distinguished use has been made of it from time to time. The letters are small on the body, with long extenders, and low capitals which are very little thicker in main-stroke than the lower-case. The strokes are extremely thick in proportion to the x-height, and since there are no fine hair-lines the letters are particularly well suited to art paper. Only 10, 11, and 12-point are available for text composition. The italic was designed by Goudy as a mate for the roman, and not derived from an earlier letter. Alternative lining figures are available.

§ 59 · MONOTYPE BELL (SERIES 341)

Improved methods and materials in printing (including the smooth wove paper [§ 180] used by Baskerville) enabled types to be still more sharply cut in the latter half of the 18th century; the romain du roi was no longer a novelty, but its influence had not diminished. In 1784 Firmin Didot, a member of an illustrious family of Parisian type-founders and printers, introduced a genuinely 'modern face'. He had already improved the point system invented by Fournier, and brought something of the same mathematical approach to designing his types. The contrast between main-stroke and hair-line in Didot's roman was more marked than in previous series, but was not excessive; the design was admirably clear and open, and by no means deserved to be travestied as it has been. Didot had already produced an italic which harmonized closely with this roman, having the same kind of serif, and being wider set than Fournier's italic.

Les artistes choisis par Monsieur pour exécuter son édition de la Gerusalemme liberata demandent avec confiance aux souscripteurs de cet ouvrage un délai de quelques mois pour en mettre au

Cet art qui tous les jours multiplie avec grace Et les vers de Virgile et les leçons d'Horace; Qui, plus sublime encor, plus noble en son emploi, Donne un texte épuré des livres de la Loi,

FIGURE 16. Firmin Didot's roman and italic of 1784.

In the year after the new roman appeared, John Bell, a London type-founder, printer, publisher, and newspaper proprietor, visited type-founders and printers in Paris. He was already known as an innovator, having popularized the use of the short s within words to replace the long f. In 1788 Bell produced the first British modern face, cut for him by Richard Austin. Although evidently influenced by Didot's design, Austin's letters retained some old face characteristics—the stress was not quite consistently vertical nor the top-serifs quite uniformly horizontal, and all serifs were bracketed; the italic too was in the style of Baskerville rather than in that of Didot. An original feature was that the figures ranged with each other instead of differing in height, and figures of this kind are known as modern, lining, or ranging figures—1 2 3 4 5 6 7 8 9 0. The Monotype Corporation's

facsimile revival, copied from Bell's original punches, now in the Stephenson, Blake foundry, appeared in 1931.

The letters are large on the body, and rather narrow; the capitals are quite heavy in comparison with the lower-case letters, but are commendably low. Like that of Baskerville, the italic is cursive and narrow-set. The small capitals have the same thickness of main-stroke as the italic lower-case, which is substantially less than that of the roman.

Didot's new roman and italic were soon copied – not particularly well – in Germany. One of the founders who produced types in the Didot style was Justus Erich Walbaum, who was at work between 1799 and 1836 at Goslar and Weimar. His letters lack the regularity and precision of cut of Didot's, but in general retain the proportions of the original. His matrices remain in the possession of the Berthold Foundry of Berlin. The Monotype Corporation produced a facsimile revival in 1933.

In its text sizes, Walbaum is light and particularly open and wide; the display founts are blacker, and show a much increased contrast between thick and thin. The letters are small on the body and rather loosely fitted. The italic, closely copied from that of Didot, has no serifs on the descenders. Walbaum Medium and Medium Italic (series 375) are bold variants, all sizes of which show a sharp contrast between main-stroke and hair-line. Alternative hanging figures are available.

$\S61$ · monotype bodoni number 1 (series 288)

Although it was the Didots who introduced the modern face, and although versions of their types are available for mechanical composition, the most popular series of Didot-style types are adapted from the designs of Giambattista Bodoni of Parma. Bodoni took charge of the Duke of Parma's press in 1768; he started with genuinely old face types, soon began to use transitional designs (some of them Fournier's), and in 1785 he copied the new Didot modern. Thereafter he rarely used any other kind of letter.

Boiloni was an ostentatious printer, concerned far more that his books should be impressive than that they should be accurate or convenient in use. Wide margins and deep leading mattered more to him than close and even word-spacing; in his types, he preferred precision to grace and legibility. His fame rests on the accuracy of his punch-cutting, the pomp of his *mise en page*, and the perfection of his presswork.

The machine-set types which now bear his name are not direct copies of his designs, but adaptations of typefounders' copies of Bodoni types. Some of the subtlety of the originals has been lost in the transition, but the general appearance of the various 'Bodoni' series is similar to those from which they are derived.

This version was copied from types supplied by the Nebiolo foundry of Turin, and was first produced in 1935. It is perhaps the most graceful and attractive of the Bodoni series, pleasantly open and regular, with very tall and rather heavy capitals. It is small on the body, and, unfortunately, available only in three founts, 10, 12, and 14-point Didot, cast on 11, 13, and 14-point English bodies. The italic, like that of Didot, has roman serifs.

§62 · MONOTYPE BODONI NUMBER 2 (SERIES 357)

Like Fournier, Bodoni cut his romans in various weights and sets. Number 1 (§61) is a version of one of the lighter and narrower designs; number 2, shown here, copied from founder's type in 1932, is both wider and heavier. It is still however of medium weight only; the contrast between main-stroke and hairline is obvious but not excessive. This kind of Bodoni is generally known as 'Bodoni Book'; Linotype and Intertype are both equipped with series so named, and there is a Monotype series (Bodoni number 5, series 504) which is very similar. These four series, for three kinds of composing machine, consist of composition founts only, having no display sizes. The Monotype range also includes a display series, Bodoni number 4 (series 254), very light and round, and in some ways closer than other series to the true Bodoni style.

§ 63 · MONOTYPE BODONI NUMBER 3 (SERIES 135)

This is the most widely used of the 'Bodoni' designs. It represents Bodoni, not necessarily at his worst and by no means at his best, but certainly at his utmost. More often seen than the lighter series, it is in a sense more typical of his work than they, since he was responsible in part at least for the tendency to increase the contrast between thick and thin strokes.

If it be accepted that those parts which the letters of the alphabet have in common with each other should not be emphasized at the expense of those parts which are individual, this is a bad form of letter. It can be properly used only in the style for which it was designed—set in very widely leaded lines and printed on a soft-surfaced paper. Adequately deep leading cannot often be afforded these days, and the series is not gaining in popularity. It was, however, one of the earliest Bodonis to be cut for machine composition, having been copied in 1921 from types cast in Italy, and is available in a full range of founts, with a mated bold and bold italic (Bodoni Bold number 2, series 260). Linotype Bodoni has similar advantages; Intertype Bodoni has been cut in display sizes only.

This design is one of those extreme forms of letter which require particular care. Of all the text types now in general use, it is probably the boldest and widest-set for its x-height; and the contrast between thick and thin is extremely abrupt. The capitals are tall in comparison with the lower-case, and the italic, like other Bodoni italics, has a strong family likeness to the roman.

§64 · MONOTYPE SCOTCH ROMAN NUMBER 1 (SERIES 46)

Not all British typefounders were very enthusiastic about the modern face in its developing form, but they were compelled to follow the fashion. Bell's British Letter Foundry was sold in 1797, and its chief punch-cutter, Richard Austin, was free to work for other foundries. His own idea of a good modern face was perhaps expressed in the founts he cut for Bell; but to be in the fashion he produced rigid versions of the Didot and Bodoni style of letter. Some of these founts were supplied to the Wilson Foundry of Glasgow, already mentioned as having produced a good transitional design (§ 54); others went to the firm of William Miller and Co. of Edinburgh (Miller had once been foreman of the Wilson foundry). The popularity of Austin's designs spread beyond Scotland, and not unnaturally became known as Scotch. This Monotype revival, cut in 1907, was one of the corporation's earlier series.

Unlike the letters of Didot and Bodoni, those of Scotch Roman are large on the body, with short extenders, and are particularly bold in the founts below 10-point; the three largest founts, 10, 11 and 12-point, are considerably lighter. The capitals are not by any means too tall, but are excessively heavy. Like that of Bell, the italic remains as cursive as a modern italic can be; roman serifs on short italic letters seems to be one continental innovation that Austin could not tolerate. Linotype Scotch number 2 is a similar design, which has the advantage of including display founts.

§65 · MONOTYPE SCOTCH ROMAN NUMBER 2 (SERIES 137)

This is a considerably lighter, less mechanical, and more loosely fitted design, cut in 1920. The gradation of weight from fount to fount is rather more even than in number 1, but in general the two series are similar; both are spoilt by the disproportionate weight of the capitals in most founts. Intertype Scotch and Linotype Scotch number 1 are roughly similar designs.

§ 66 · MONOTYPE MODERN EXTENDED NUMBER 1 (SERIES 7)

The new Miller foundry (later Miller and Richard) was perhaps the first to concentrate on modern face to the exclusion of all others. Austin cut a number of their founts, and it is possible that he was responsible for the original of this series. Early in the 19th century The Times began to use a Miller and Richard modern face for its main text; and when that newspaper installed Monotype machines to replace the earlier forms of type-setting machinery it had been using, the text face was carefully re-cut for the Monotype and brought into use in 1902. Not particularly distinguished in letter-form, the series is equipped with a great range of mathematical and other special sorts; the mathematical range alone numbers over 600 sorts.

Many other modern faces, which are rarely if ever used and which have little to recommend them to the typographer, are left out of this account, without regret.

§ 67 · MONOTYPE OLD STYLE NUMBER 2 (SERIES 2)

Throughout the first half of the 19th century, modern faces held the typographic field against nearly all comers. Not all typefounders and punch-cutters were very enthusiastic about this kind of type-face, but the popular demand had to be met.

The same years, however, had seen the rise of the London publisher William Pickering and of Whittingham's Chiswick Press. Pickering was an innovator in book production; he introduced cloth as a binding material during the 1820's, and was one of the first publishers to instruct his printer in details of book design. Equally original was his liking for old types, at that time neglected and unfashionable. He had already made some use of Baskerville's types, and in the 1840's he and Whittingham began to use types cast from Caslon's matrices.

The reappearance of an 'old face', as Whittingham called the Caslon types to distinguish them from modern, revived interest in letters of this style. The mechanical regularity of the modern face had had its effect on the taste of the time, and the printers of the day considered some of Caslon's founts to be too irregular in form for satisfactory use.

In 1852 Miller and Richard, who had been in the forefront of modern face production, led the way to a new development by issuing specimens of a regularized old face which they named Old Style. The new class of old style types, of which this was the first, reverted to gradual shading and to oblique top-serifs, but retained vertical stress, and was a good deal thinner in stroke and larger on the body than the best of the old faces. Types of this kind became popular in the second half of the 19th century, without ousting modern faces. The Monotype machine was introduced to British printers in 1901; the first two type-faces cut for it in England were, first of all, a modern, cut in 1900, and, later in the same year, this old style, adapted from a popular design more recent than that of Miller and Richard.

Like the other types of its class, the design is rather thin and colourless; its use is now confined almost entirely to textbooks which make use of its considerable range of special sorts for foreign language composition. No inclined figures are available. The letters are large on the body, light and open, and rather wide. Similar designs appear in the Linotype and Intertype ranges as Bookprint and Bookface Old Style.

§ 68 · MONOTYPE IMPRINT (SERIES 101)

In one sense all text-composition type-faces now in use belong to the 20th century, since, whatever the origin of the design, that design has been redrawn for the composing-machine. The types already described, however, were all based on designs of past centuries, and by general agreement each can be classified as venetian, old face, transitional, modern, or old style. The remaining nine series (§§ 68–76) in this chapter were designed during the present century.

Imprint was cut by the Monotype Corporation in 1912, to the specification of J. H. Mason and Gerard Meynell, for use in their new typographic journal *The Imprint*. The journal has unfortunately gone the way of several excellent publications of its kind, but the type-face, offered to the trade by the proprietors, survives in general use and esteem.

Imprint was redrawn from an old face of the late 18th century, 1 but is rather larger on the body than most old faces. The letters are sturdily drawn, and well suited to all kinds of modern use. An extremely wide range of special sorts is available for foreign language and other special settings. The mated bold, Imprint Bold (series 310), has a slightly larger x-height than the ordinary roman. Imprint Bold number 2 (series 410) is equipped with a mated bold italic. There are alternative old face and modern figures.

A very similar Intertype series is known as Period Old Style.

\$69 · MONOTYPE LUTETIA (SERIES 255)

The historic foundry and press of Enschedé en Zonen at Haarlem is one of the few places in the world where punches are still cut by hand as a matter of course. The chief designer for the foundry during this century is Jan van Krimpen, who designed Lutetia in 1923 and 1924, and supervised its cutting, for the exclusive use of Enschedé. The work was completed in time for the type to be used for official Dutch printing for the International Exhibition of Modern Decorative and Industrial Arts, which took place in Paris in 1925. The type made its first appearance in a book describing Dutch contributions to the exhibition, and takes its name from the city of its début. The Monotype version appeared in 1930.

All the founts of the series are cast on Didot bodies, which are larger than the English bodies. This, for instance, is the 12-point Didot fount, and is cast on a 13-point (English) body. The letters are rather narrow and closely fitted; the design is perhaps a little too fanciful to win much popularity. The e used hitherto, the slanted cross-stroke of which catches at the eye of the reader, can be replaced by an e of more comfortable appearance, which is used in the remaining sentences of this note. The capitals are rather tall but not unduly heavy; E, F and L appear to be too wide. The letters are very small on the body. The series is graced with some delightful italic swash letters of original design, and with a decorative italic in the chancery style, which is approximately as thick in the main-stroke as the roman. There are both hanging and lining figures.

§70 · MONOTYPE PERPETUA (SERIES 239)

Perpetua was commissioned by the Monotype Corporation and designed by the late Eric Gill, the sculptor and wood-engraver. The first founts of the design were completed in 1928, and the first specimen of the series was a translation of *The Passion of Saints Perpetua and Felicity*. Gill was a man of ideas and of strong personality, and the original form of some of the letters shows that the design of alphabets for printing has further achievements to offer to artists of the stature to reach them.

The proportions of roman capitals, which appear in some of the engraved inscriptions of the Romans and later in 15th and 16th-century printing, were somehow forgotten by the 18th century; Caslon's capitals, for example, are monotonously even in width. The old proportions reappeared in French typography of the 19th century, but Gill was the first to design capitals of this kind for machine composition. A quarter

of a century after the first of them appeared, the various Perpetua Titling series are still more popular in Britain than almost any other titling fount or alphabet of roman capitals.

Gill's originality appears most clearly in the roman lower-case, in which several letter-forms are new in detail; all are adapted from alphabets designed for engraving in stone and wood. The capitals are conspicuously shorter than the ascenders, another characteristic of early old faces. The lower-case is rather 'modern' in appearance, having thin hair-lines and strong main-strokes; the top-serifs, in the smaller founts, are unbracketed hair-lines, but they are not quite horizontal, nor is the stress quite vertical.

The italic lower-case is equally remarkable. Certain letter-forms peculiar to italic—a efk and y—are retained, though not all conventional in detail; one letter—g—is derived from italic handwriting or printing of the early 16th century. But the italic is not really an italic at all, it is a sloped roman; such letters as h i l m n r u x and z have roman serifs at the foot of the stroke as well as at the top, and differ substantially from roman only in being inclined to the right. Gill had been designing italic letters of this kind since the 1900's, and had published a design very like it in 1909. Unlike later 'sloped roman' experiments, Perpetua italic is just different enough from the roman to be visibly different when used as an auxiliary.

The 'old face' tendency of Perpetua roman in 30-point and above is interesting, though not important so far as the text is concerned. In

48-point Perpetua

its 12-point size, Perpetua is unusually small on the body—smaller, in fact, than the 12-point of any other series now in general use for text composition. The capitals are very little heavier than the lower-case letters. For their x-height, the lower-case letters are particularly wide set. There are both hanging and lining figures.

There is a mated bold roman, Perpetua Bold (series 461), and several titling series—Titling (series 258), Titling No. 2 (series 543), the graceful Light Titling (series 480), and the useful Bold Titling (series 200).

$\S71 \cdot \text{MONOTYPE EMERSON (SERIES 320)}$

The designing of this series was begun in Germany in 1930 by Joseph Blumenthal, the New York printer and teacher, and part-owner of the Spiral Press. Named Spiral, the series was cast by the Bauer Foundry from hand-cut punches; in 1935 the Monotype version appeared, renamed Emerson.

Emerson is particularly well suited to modern processes and surfaces; every part of every letter is strongly drawn, and the proportions of the letters are good. In detail they are perhaps less satisfactory, but the general appearance of the design is clear and pleasant; the style in general of letters and figures is that of an old face. The letters are small on the body, and the capitals are tall but lightly drawn. The range of composition founts is limited, but more are being added. The italic has a close affinity with the roman, being similar in set and weight and in the treatment of top-serifs.

§ 72 · MONOTYPE ROMULUS (SERIES 458)

The design of the Romulus family was begun in 1931 by Jan van Krimpen. The original family is quite the most comprehensive ever designed for bookwork, since it includes three kinds of text roman — the standard roman (with sloped roman), roman semi-bold and roman bold condensed — and four mated sansserifs, which align with the text founts; the sans-serif founts are known as Light, Normal, Semi-bold and Bold, and the second and third of these are matched in weight with Romulus roman and semi-bold. In addition to all this, there is an ornamental italic called Cancelleresca Bastarda, which aligns with the other founts of appropriatesize if they are leaded. All these founts have been cut by Enschedé; only the standard roman and the semi-bold (Romulus Bold, series 520) however were cut by Monotype. The first founts appeared in 1936.

Romulus – the name was suggested by Mrs. Beatrice Warde as suitable for a plain roman type of the traditional kind – is designed in the style of an old face, but is wider-set and more regular in detail than most series of that class. The letters are wide-set, and rather light. They are very small on the body indeed, and are cast on Didot bodies. The capitals are very tall in comparison with the short letters, but are lightly drawn. Alternative lining and hanging figures are available.

Romulus and italic: Romulus normal sans-serif
Romulus semi-bold: Romulus semi-bold sans-serif

Romulus bold condensed Romulus light sans-serif

Romulus bold sans-serif

Romulus and Cancelleresca Bastarda

Romulus is mated with a sloped roman (§74), which is handsome but not easily distinguished from the upright roman, being not only similar in shape but in thickness of stroke. Sloped roman small caps are an unusual feature of the series.

§ 73 · MONOTYPE TIMES NEW ROMAN (SERIES 327)

The Times was content for more than a hundred years with its Miller and Richard modern face, and with the facsimile re-cutting for use with the Monotype. This was not entirely due to conservatism; the Miller and Richard series is more pleasant than the ugly Ionic and kindred families still used by many newspapers. Indeed, The Times had often led the way towards new developments in printing technique and was soon infected by the revival of interest in type design which was growing during the 1920's. In October 1932 The Times appeared in a completely new series of type throughout, more practical as well as more handsome than the old. This series was cut for The Times by the Monotype Corporation under the supervision of Mr. Stanley Morison, who was typographic adviser to both newspaper and corporation. A year later The Times New Roman was made available to the whole printing trade, as Imprint had been twenty years before.

In structure the design closely resembles Monotype Plantin. The letters are unusually narrow, unusually large on the body and strongly drawn, like those Dutch and German founts of the late 17th and early 18th centuries of which Janson and Ehrhardt are copies. In order to compensate for the slight thickening effect of newspaper printing, the serifs and hair-lines are more sharply cut than in most old faces, and in these details the design is 'modern' in appearance. The descenders are unusually short, for economical composition in the narrow columns of a newspaper; for the wider measures of bookwork more space is needed between the lines, and the alternative long descenders may be used. There is a large range of special sorts for foreign language setting and both hanging and lining figures.

The range of founts is extensive, and the smallest founts of all are particularly good, though some of the bowls of the lower-case 4½-point have been cramped to leave room for descenders. The series is seen at its best below 12-point; the proportions of the larger founts, though practical, lack grace. The italic is in the style of Didot italics; some of the non-ascending lower-case letters have roman top-serifs, only slightly bracketed and almost horizontal.

Times Bold (series 334) is an unusual design. In line-cast series, bold is duplexed with medium, and must therefore have the same set; line-cast designs therefore tend to be semi-bold rather than bold, in order to keep the counters open. Monotype bold founts have open counters and heavy main-strokes as well, since they are wider set than the medium. Times Bold, designed to be set on both line-cast and single type machines, is a genuine bold of equal set with medium, and therefore has particularly narrow counters. There is also a useful bold italic.

Times New Roman Wide (series 427) is an extended version of the same design, which may be equally useful for bookwork. The letters are slightly bolder than those of series 327, and slightly smaller on the body; the capitals are noticeably smaller. In spite of its name, series 427 is very little wider than the standard series, and is very much narrower for its

x-height than most bookwork designs. Long descenders are available; series 427, when used with long descenders, is known as series 627, Times New Roman Book. The alignment of the letters on their body is such that they cannot be used in the same line as Times Bold.

Times New Roman Semi-Bold (series 421) has been used in small sizes for text composition. It is more legible than series 334, having more open counters; unfortunately it does not align with either series 327 or series 427, and cannot therefore be used as a companion bold, useful though it would be. The series includes a semi-bold italic.

The other series which make up this very comprehensive family are Times Titling (329), Bold Titling (332), Bold Titling Number 2 (328), the 8-point of which is also cut in italic, Extended Titling (339), and Hever Titling (355), the latter being of a design fundamentally different from that of the other titling series.

Times and Times Bold are also available for setting on the Linotype and Intertype machines.

§74 · LINOTYPE ELECTRA

Electra was designed for the Linotype by W.A. Dwiggins, as 'an effort to produce a fast-moving face a little out of the line of "old face" or "modern". I think the name Electra suggested itself as a possible expression of electric energy and fast pace.'* The letters are particularly narrow, and large on the body; alternative long descenders are available, and are used here. Unusual details of the design are the flat-topped arches of h m n p and q, and the heavy top-serifs of the short letters. The capitals are rather tall: the figures, old face. The series was first made available in America in 1935, and has been widely used there; it has been available in Britain since 1937, but has not become very popular, perhaps because of its unusual appearance, and the range of founts is still very limited.

In his essay 'Towards an Ideal Italic',† Stanley Morison had pointed out the unsatisfactory nature of most italics as auxiliaries to roman, because of their dissimilarity of design. He suggested that roman and italic letters should be related very closely indeed in design, and that italic might indeed be differentiated from roman only by its slant. Following this suggestion, Dwiggins designed a pure 'sloped roman' for Electra, with no italic characteristics whatever, except the inclination to the right. The result, though excellently suited to composition for line-casting, was not a success, for the slight slant of the letters was not enough to distinguish them from roman. Dwiggins designed a more cursive italic, but this is not available in Britain.

^{*} From a letter to the author.

[†] In The Fleuron. Number 5, 1926.

§ 75 · MONOTYPE SPECTRUM (SERIES 556)

This face was designed between 1941 and 1943 by Jan van Krimpen, at the instance of the Spectrum Publishing Company of Utrecht. In July 1956, as this book goes to press, the Monotype Corporation is still engaged in cutting its version of the design, and display sizes will follow.

The rather upright italic, chancery in style, is particularly narrow, for economy in the Bible composition for which the face was designed. The capitals are lightly drawn in comparison with the lower-case, which is heavier than the small capitals. Hanging and lining numerals are available in both roman and italic.

§76 · LINOTYPE PILGRIM

In 1936 The Limited Editions Club of New York issued an edition of Sterne's Sentimental Journey, designed and printed by Eric Gill. For this book, Gill designed a 14-point roman which he called Bunyan; the punches were cut for him by the Caslon foundry. The Linotype version of this fount, renamed Pilgrim, appeared early in 1953.

Perhaps the most conspicuous feature of the series is the slight contrast between the thick and thin strokes; the vertical stress is hardly noticeable. The capitals are unique among those of the text series shown in this chapter, since they have exactly the same thickness of main-stroke as the lower-case; they are also lower in proportion to the lower-case x-height than those of any of the other series. In addition to the ordinary small capitals, special roman and italic small capitals are available, duplexed together. The figures are old face. The italic, like that of Perpetua, is nearly a sloped roman; it was adapted for the Linotype from Gill's drawings of two capitals and six lower-case italic letters.

§77 · TYPES FOR THE FUTURE

These thirty-seven faces, with their families, form the majority of bookwork type-faces at present available to the British typographer. What is to be hoped of the future?

Nothing would be gained from an attempt to forecast the typographic taste and fashion of time to come, but the problem is technical as well as aesthetic. Certainly it is to be hoped that future type-designs will possess the practical virtues, whatever their artistic value. Some of the 20th-century types described in this chapter may point the way to future developments.

The range of special sorts at present available will probably be improved in the course of time. Superior figures and fractions may be needed for several kinds of setting, but are not to be had for use with many series; most of these sorts are 'modern' in design, and stand out incongruously from the midst of a page of old face. Too few series are equipped both with old face and with modern numerals; the typographer may often require them both in the same fount. One of the most conspicuous defects of all but one Monotype and three Linotype text series is the absence of sloped small capitals; these would certainly be widely used if they were generally available, for instance in headlines set in small capitals where a foreign phrase or a title of a book is to be included; or for headings in the text, to differentiate them from headlines in upright small caps; or for the names of characters in plays, particularly where the names occur in the midst of stage directions set in italic upper and lower case.

Future designers may also be rather more enterprising than those of the past in providing new or adapted marks of punctuation, and even subsidiary characters. Van Krimpen, for instance, provided for use with his Romulus series a small oblique stroke, which can be used in place of a comma, full-point, or long oblique; for instance:

HAARLEM / JOH. ENSCHEDÉ EN ZONEN 'S-GRAVENHAGE / FIRMA L. J. C. BOUCHER MDCCCCXXXXIII

The modern dislike of punctuation in display lines has led to the use of a point which ranges with the centre of the short or the capital letters, and which is used to replace either the full-point or the comma, as in the section headings of this book. Initiative in the planning of punctuation can also be seen in figure 19, § 88, and in the use of the Centaur asterisk (*) in figure 20, § 90.

That graceful and useful printing letters can still be designed is shown for instance by Romulus and Times New Roman. Both are examples of the elaborate type-family for which future book-designers may find a use and create a demand; the Monotype Corporation's policy of matrix production includes the expansion of existing series into extensive families, and this policy is likely to exert some influence on fashion in type-selection. There is reason to expect both good parent designs and large numbers of progeny.

The tendency of industrial book-manufacture of the better quality is towards the use of hard, comparatively smooth paper. Fluffy loose-textured papers cause trouble on the machine, do not take ink well, and give the book a spongy, unnecessary bulk; harder and more highly finished papers, on the other hand, may be used with half-tone blocks (§ 125) and in themselves are more durable. Such papers do little to thicken the hair-lines of printed letters; less pressure is needed in printing, and the ink does not

spread outwards to the same extent. This lighter impression reduces the wear on the printing surface, and produces a page which is flat and smooth rather than dented and dimpled with heavy presswork. Surface and recess printing processes (chapter 15) also do nothing to thicken the fine strokes of the printed letter, whatever the paper used with them; and subsidiary processes such as electrotyping and stereotyping (§§ 131–2) should cause little or no distortion.

Deprived of any artificial thickening, then, type-designs of the future will need strength of their own. Really thin hair-lines, and thus any abrupt contrast between the thickest and the thinnest strokes, may come to be considered grave weaknesses. Future type-faces will perhaps be designed to make a good appearance on art paper, without seeming to become congested on a fairly smooth machine-finished surface.

As regards proportions, it is to be hoped that there will be no dearth of reasonably wide series. Among strongly drawn designs, in which the contrast between thick and thin is not too marked, there are several particularly narrow series—Poliphilus, Plantin, Ehrhardt, and so on—but not enough wide ones such as Emerson. Economy in set is certainly valuable for special use, but in combination with other qualities a generous width, as in Baskerville, does much for legibility.

Book designers have been too ready to dispense with adequate extenders, and descenders in particular. It would be impossible to prove the value of length in extenders, but there can be no denying that strokes of proper length improve the appearance of individual letters and of composed pages. They will also do something to prevent the excessive crowding of lines into the page which is a feature of second-rate typography. In future type-series we shall perhaps see alternative *short* descenders, the use of which in bookwork will be an exception rather than a rule.

As for italics, the history of type-design up to the present day offers the designer a wide choice of style. Van Krimpen has shown that the 20th century can produce a new italic in the chancery style. The very comprehensive class of old face italics does not seem to have inspired many modern designers, but still includes much that would be worth reviving; the sprawl of Caslon and 'Garamond' italics is not typical of the whole class. Various kinds of 'modern' italic, on the other hand, have been designed to accompany 20th-century romans, though most authorities agree that italic was by no means at its best during the modern period. The sloped roman seems to have lost its popularity, probably because of its inadequate differentiation from ordinary roman type. One compromise, however—Perpetua italic—is still admired and may represent a starting-point for future designers.

Whatever form new type-series are to take, it is to be hoped that they

will be introduced only to meet a need, and then only if the need is evident. The repertoire already available is large, and the production of new series for the sake of novelty tends to become a burden to printers.

BOOKS

- BERRY, W. TURNER, and A. F. JOHNSON Catalogue of specimens of printing types by English and Scottish printers and founders, 1665-1830, with an introduction by Stanley Morison (Oxford books on bibliography) Oxford University Press, 1935 illustrations.
- BERRY, W. TURNER, and A. F. JOHNSON An encyclopaedia of type faces Blandford Press, 1953 quarto: type examples: bibliography.
- INTERTYPE Specimen printings of Intertype wide-tooth English depth matrices Intertype Ltd., Slough, no date: not for sale - quarto. [A book of separate single-sheet specimens.]
- JOHNSON, A. F. Type designs: their history and development Grafton, 1934 illustrations: bibliography. [Supplements UPDIKE, below.]
- LINOTYPE Specimens of faces: matrix information Linotype and Machinery Limited, 1953: not for sale quarto.
- MONOTYPE Specimens of the type-faces, borders, ornaments, rules and other material cast on the Monotype type composing and casting machines Monotype Corporation, no date quarto. [A book of separate single-sheet specimens.]
- MORISON, STANLEY Type designs of the past and present The Fleuron, 1926 illustrations.

 MORISON, STANLEY A tally of types cut for machine composition and introduced at the University Press, Cambridge, 1922-1932 University Press, Cambridge, privately printed,
 1953: not for sale type examples. [Contains historical information of much interest.]
- REED, TALBOT BAINES The history of the old English letter-foundries First published 1887: new edition, revised and enlarged by A. F. Johnson, Faber and Faber, 1952 - illustrations: bibliography. [Essential to the study of type design and its history.]
- STEPHENSON, BLAKE Specimens of printing types from Stephenson Blake, the Caslon Letter Foundry, Sheffield Sheffield, 1950.
- UPDIKE, DANIEL BERKELEY Printing types, their history, forms and use: a study in survivals –
 Oxford University Press: first published, 1922; 2nd edition, 1937: two volumes illustrations. [The principal work on the subject.]
- See also, after chapter 1, JENNETT, MORISON, SIMON, and UPDIKE; after chapter 5, DE VINNE (Plain printing types), GOUDY, LEGROS, and THOMAS; after chapter 7, BIGGS (Approach) and PYKE; in § 240, MORISON (Four centuries, 1924); and in § 241, MORISON.

Principles of text design

Text composition must both appear to be legible and be legible. The casual glance must first be attracted to the printed words, and then must be invited to travel along the lines. Any oddity or ambiguity that may catch at the reader's eye or interrupt the rhythm of reading is best avoided.

A person equipped with determination and adequate eyesight can read almost anything without conscious difficulty; up to a certain point, bad printing is not incapable of being read. Printing which is bad beyond this point is too bad to read, and is therefore not worth carrying out. The limit is rarely if ever passed, but is all too often approached. The production of certain newspapers is an example; some of the type-faces used for the text are spindly and deformed: the spacing of the text and the arrangement of headings is sometimes inept to an extreme: the use of worn matrices causes hair-lines to appear between the letters: and parts of letters and marks of punctuation often fail to appear on the paper. But people put up with it—indeed, they hardly notice; the newspapers are often read by indifferent light on moving buses and trains, and in crowds where the reader has to hold the paper much too close to his nose.

Reading without conscious difficulty is not the same as reading without strain. Some children read avidly and surreptitiously after going to bed, by the dim light of an electric torch, or in the gathering shadows of a summer evening. The child may notice no difficulty; but a few years of this kind of eye-strain are certain to aggravate defects of vision. The eye-strain inflicted on older readers by bad typography, perhaps too slight to be noticed at the time, may cause headaches and a gradual deterioration of the sight. Type which is too small or too large, too closely set or too widely spaced, undoubtedly blunts the pleasure of reading, and tends to discourage all but the enthusiast.

Legibility, then, is the aim. It may be defined as the capacity of a text to be read, by the reader for whom and in the circumstances for which it is intended, with ordinary speed and accuracy and without undue effort.

¹ In his 'A psychological study of typography' Burt points out that text is not always as legible as it looks to the reader.

It is impossible to prove at what point a printed text ceases to be legible according to this definition, or even whether one text is more legible than another. There are no generally accepted principles according to which legibility may be secured without fail. The typographer's only guides are his eyes; and he cannot always test his specifications for text composition by sustained reading, but must judge their effect by looking at one or two specimen pages. He can sharpen his judgement only by evaluating every example of text setting that comes within arm's length, and thus keeping his eyes sensitive to detail and proportion.

Very little has been proved about legibility, and this is one reason why tradition in the style of text setting retains its influence. The advantages of such radical alterations as the use of sans-serif types for sustained reading can only be asserted in face of the disagreement of most readers and typographers.

The unpopularity of even so small a change as the omission of serifs suggests that every printed detail may have some value to the reader. The details of a page which is to be printed can be varied to a considerable degree; each type-face has its peculiarities of serif, stress, weight, set, fitting, and size on the body, and each fount in the series can be set in a number of different measures and spaced differently both horizontally and vertically. Quite apart from this, ink of various degrees of black may be used on papers of a variety of shades, and there are other variables which are dealt with in other chapters. It is by a careful adjustment of all the variables of the text page to each other, under the guidance of a practised and sensitive eye, that legibility is achieved.

The design of the text page is the chief task of the book designer; not only this chapter but six of those which precede it and nine of those which follow deal more or less directly with this task. This chapter only describes some principles governing the choice of text area and the arrangement of type within it; the next chapter is concerned with details of arrangement, and the chapter after that with decorative typography, which to some extent affects the text page.

§78 · TEXT AREA

The dimensions of the text area are of course influenced by those of format and margins, but are too important to be determined finally by such influences. The margins are in fact only the extra space on the page round the text, and if they have already been planned they may have to be altered to suit the text area.

For purposes of design, the text area may be defined as the space occupied by lines of text and by the headline if there is one. The headline usually occupies enough space to count as an extra line; the page number,

if it is placed in any position other than in the headline, is not conspicuous enough to appear to extend the area. If marginal notes or illustrations are to be used, there will in effect be two text areas; the appearance of any page which may have nothing in the margin must be considered as well as that of the pages whose margins are occupied. If the text is to be set in two or more columns, the space between the columns must be taken into account; unless the columns are to be uncomfortably crowded, this space may extend to a pica or more.

The measure is influenced by the set of the fount to be used and the number of ens to be set in the line. For the convenience of the keyboard operator the measure is described in picas or 12-point ems; half or quarter picas may be used.

The measure of any setting may also be influenced by the nature of the text. In the setting of the main text, this is particularly true of verse (§ 85), but it may apply to the preliminary and back pages of any book. If, for instance, an index contains in each line only one word or phrase and a few page numbers, all in small type, the majority of the lines would fill less than half the measure suitable for ordinary text composition, and two columns will therefore be far more economical than one. In the same way a narrow measure, whether in two columns or not, is particularly suitable for any text, such as a dictionary, in which there is a high proportion of short lines.

The depth of the text area can also be described in picas, but is better described in lines of text (for instance, 11-point $1\frac{1}{2}$ -point leaded, 38 lines and headline). A more meticulous description would include the body of the headline and also the extra space between headline and text. The depth is governed by the body of the text fount, the extra interlinear space, and the number of lines on the page.

To use the same text area throughout the book, for type, illustration, and everything else, simplifies imposition and gives the pages unity of appearance. This evenness of area from page to page, at least so far as the text is concerned, has in fact become one of the essentials of good bookwork, and although text need not of course occupy the whole area it is hardly ever allowed to occupy more, even when difficulties would be solved by a relaxation of the rule. Few book printers, for instance, would allow the addition of a line to a full page, in order to link a footnote with the last line of text on the page. Some printers, however, are prepared to spoil the appearance of the opening by reducing the lead on one page in order to accommodate an extra line within the standard text area.

Like those of the page itself, the proportions of the text area have their own aesthetic value, and both the appearance of the book and its legibility may be improved by the use of a slightly narrower measure than usual.

§79 · FOUNT

To choose a fount is primarily to choose the size of the type. The design of the type has already been considered in chapter 7. That founts within a series may differ substantially in character must not be forgotten; this is particularly important when a series is being used in which the quality of the founts is uneven. In most newly designed series, some three founts are cut from the same drawings; considerable differences of body necessitate fresh drawings, because small founts need to differ in proportion from large ones. There are, therefore, some very real differences between founts, but they are not always evident. If, after choosing a series, the designer feels dissatisfied with the particular fount he would wish to use, he may have to go back and find another series; much of book design consists of compromise and reconsideration of this kind.

First of all, type-size must suit the reader for whom the book is intended and the circumstances in which it is to be read. The apparent size of letters is very difficult to define; it is not a matter of any one dimension, though the x-height has a good deal to do with it. Nor has anyone been able to prove that a certain type of reader requires type of a certain size. Sir Cyril Burt has suggested certain type-sizes as suitable for certain age-groups among schoolchildren, basing himself on class-room tests. The results of these suggest that children under 7 need the equivalent of 24-point Times New Roman, 6-point leaded, and that, for children over 12, 11 on 12-point Times in a measure of 27 picas will be satisfactory. Most typographers of experience will, however, reject the former standard as too big and the latter as too crowded.²

As Burt suggests, display sizes of type are probably essential for children first learning to read. Smaller sizes can be used, and are used, but they almost certainly interfere with the process of learning. The typographer must decide for himself which founts to use for school-books; but 18-point is probably as large a type as can reasonably be used in an octavo book, for continuous setting. Larger founts can be used for single words or phrases.

An 18-point of medium x-height is probably big enough for lectern books, which are to be read at arm's length or less. Very large books, intended to be studied on a table, require 14-point type, if the lines near the top of the page are to be read without difficulty. Where reading conditions are likely to be difficult in any way, the type should not be much smaller than a medium 12-point, and a large 12-point may be preferable. For the

^{1 &#}x27;A psychological study of typography,'

² At the age of 6, my daughter and most of her friends are practised and persistent readers who would be seriously hindered in sustained reading by type much over 14-point.

general run of books, modern preference appears to range from a medium 12-point down to a medium 9-point. Much smaller type was tolerated in the past; the reputation of the house of Elzevir, for instance, was based on little books set in a small 8-point. Small type is more likely to benefit a reader's pocket than his eyes; a medium 11-point is quite small enough for comfortable reading (and indeed for any appreciation of letter-form, though this will not interest the general public). Small type does not print well on rough paper, since the counters tend to fill with ink.

The set of the fount chosen must be such that there will not be too many characters in the line for the reader's convenience. Here again, there can be no standard number of ens that can properly be set in the line, and the typographer must decide for himself. Much more than 70 ens should

There is, therefore, little excuse for thinking that conditions of labour today are very different from those that long preceded them; and it is important to realize that these conditions were all along factors, as they are now, in the problem of turning out good printing. Types and books reflect the state of the arts around them, because on one side typography is an art; but they are influenced by trade conditions, because it is also a trade. Not to face these two facts, or to neglect either one or the other, is merely to fool one's self!

About 100 ens to the line is too many, particularly without leading (Caslon type).

not be fitted into the measure without a good deal of caution. The encontent of any measure with any fount can be calculated approximately from printed examples or from various cast-off books; special setting should not be necessary.

In rapid and sustained reading, most readers assimilate the words in one line with a limited number of glances. They do not look at every word separately, but focus on a particular point in the line; the words on each side of the point of focus are noticed rather than examined. The number of words (or ens) that can be noticed in this way varies according to the habits of the reader, but for the majority of readers is small. Too many ens in the line require too many glances; and the wide angle through which the eyes are required to move cause not only excessive changes of focus but movement of the head from left to right and back again. A line containing a comparatively small number of ens needs no movement of the head, and reduces both the number of glances required and the distance between the end of one line and the beginning of the next. The narrower the measure, then, and the fewer the ens in the line (down to the minimum suggested in § 80), the more pleasant the setting will be to read. If the chosen measure and fount combine to fit too many ens into the line, and if a larger fount or a narrower measure cannot be used, a two-column setting (perhaps with a smaller type and a wider total measure) may be an improvement on single columns.

§80 · WORD-SPACING

Though short lines are pleasant to read, the traditional method of composition, by which all full lines are justified to the same width, imposes a certain minimum on the number of ens per line; if the word-spacing is not to vary too obviously from line to line, and if an undue number of words is not to be broken between lines, the line must contain not much less than 40 ens. This figure will vary according to the average number of ens per word in the typescript; long words, by reducing the number of spaces in each line, make even spacing more difficult, and compel the keyboard operator to divide words frequently at the end of lines. If the average number of ens per word in the typescript is lower than usual, a skilled operator may be able to space a line of only 35 ens with adequate regularity (figure 20, § 90). A setting of this kind may be a real pleasure to read, but it cannot often be carried out effectively at high speed on a keyboard.

Monotype operators are usually trained to aim at spaces between 5 and 9 units, and to break words rather than to allow conspicuously uneven spacing. Five units is perhaps rather a wide minimum, being more than a middle-space; with narrow-set and close-fitted founts, 3 units is by no means an inadequate space. A meticulous designer may instruct the compositor to divide words rather than use spaces wider or narrower than certain limits, so far as may be possible; he may be guided, for instance, by Beatrice Warde's couplet:

Two-unit spacing overcrowds the line But agoraphobia begins with nine.

Excessively wide spacing seems to open up rivers of white down the page, across the path of the reader's eye, and breaks up the text so that it takes on the appearance of irregular patches of words instead of a series of lines. This is particularly likely to happen if the word-spacing is wider than the vertical space between the short letters of adjacent lines.

The amount of spacing after full-points and other marks of punctuation, when they close a sentence, has so marked an effect on the appearance of the text that it is a matter of text design rather than a detail of style. Although there has been controversy about the matter, the style of setting with ordinary word-spacing between sentences produces more even word-spacing, and is to be preferred to the addition of a fixed space after a sentence. The full-point itself is quite clear and appears to increase the word-space slightly, and the beginning of the new sentence is also signalled by a capital letter; no practised reader should fail to notice both these indications of a new sentence.

I HAVE READ IN THE RECORDS OF THE ARABIANS, REVEREND FAthers, that Abdala the Saracen, when questioned as to what on this stage of the world, as it were, could be seen most worthy of wonder, replied: "There is nothing to be seen more wonderful than man."In agreement with this opinion is the saying of Hermes Trismegistus: "A great miracle, Asclepius, is man." But when I weighed the reason for these maxims, the many grounds for the excellence of human nature reported by many men failed to satisfy me - that man is the intermediary between creatures, the intimate of the gods, the king of the lower beings; by the acuteness of his senses, by the discernment of his reason, and by the light of his intelligence the interpreter of nature; the interval between fixed eternity and fleeting time, and (as the Persians say) the bond, nay, rather, the marriage song of the world, on David's tes-

timony but little lower than the

angels. Admittedly great though

these reasons be, they are not the principal grounds, that is, those

which may rightfully claim for

themselves the privilege of the

we not admire more the angels

highest admiration. For why should

themselves and the blessed choirs of heaven? At last it seems to me

LEGI. Patres colendissimi, in Arabum monumentis, interrogatum Abdalam Sarracenum, quid in hac quasi mundana scaena admirandum maxime spectaretur, nihil spectari homine admirabilius respondisse. Cui sententiae illud Mercurii adstipulatur: Magnum, o Asclepi, miraculum est homo. Horum dictorum rationem cogitanti mihi non satis illa faciebant, quae multa de humanae naturae praestantia afferuntur a multis: esse hominem creaturarum internuntium, superis familiarem, regem inferiorum; sensuum perspicacia, rationis indagine, intelligentiae lumine, naturae interpretem; stabilis aevi et fluxi temporis interstitium, et (quod Persae dicunt) mundi copulam, immo hymenaeum, ab angelis, teste Davide, paulo deminutum. Magna haec quidem, sed non principalia, id est quae summae admirationis privilegium sibi iure vendicent. Cur enim non ipsos angelos et beatissimos caeli choros inagis admiremur? Tandem intellexisse inihi sum visus, cur felicissimum proindeque dignum omni admiratione animal sit homo, et quae sit demum illa conditio quam in universi se-

I have come to understand why man is the most fortunate of creatures and consequently worthy of all admiration and what precisely is that rank which is his lot in 1

FIGURE 17. An unconventional kind of traditional typography by Victor Hammer. The Latin text is set in Monotype Emerson, the translation in Garamond: both are set without justification, in order to produce close and even word-spacing in narrow measures. For the same reason,

the universal chain of Being - a rank to be envied not only by brutes but even by the stars and by minds beyond this world. It is a matter past faith and a wondrous one. Why should it not be? For it is on this very account that man is rightly called and ric sortitus sit, non brutis modo, set astris, sedultramundanis mentibus invidiosam. Res supra fidem et mira. Quidni? Nam et propterea magnum miraculum et admirandum profecto animal iure homo et dicitur et existimatur. Sed quaenam ea sit audite, Patres, et benignis auribus pro vestra humanitate hanc milii operam condonate. g Iam summus Pater architectus Deus hanc quam videmus mundanam domum, divinitatis templum augustissimum, archanae legibus sapientiae fabrefecerat. Supercaelestem regionem mentibus decorarat; aethereos globos aeternis animis vegetarat; excrementarias ac feculentas inferioris mundi partes omnigena animalium turba complerat. Sed, opere consummato, desiderabat artifex esse aliquem qui tanti operis rationem perpenderet, pulchritudinem amaret, magnitudinem admiraretur. Idcirco iam rebus omnibus (ut Moses Timaeusque testantur) absolutis, de producendo homine postremo cogitavit. Verum nec erat in archetypis unde novam sobolem effingeret, nec in thesauris quod novo filio hereditarium

largiretur, nec in subselliis totius orbis, ubi

judged a great miracle & a wonderful creature indeed. 2. But hear, Fathers, exactly what this rank is and, as friendly auditors, conformably to your kindness, do me this favor. God the Father, the supreme Architect, had already built this cosmic home we behold, the most sacred temple of His godhead, by the laws of His mysterious wisdom. The region above the heavens He had adorned with Intelligences, the heavenly spheres He had quickened with eternal souls, and the excrementary & filthy parts of the lower world He had filled with a multitude of animals of every kind. But, when the work was finished, the Crafuman kept wishing that there were someone to ponder the plan of so great a work, to love its beauty, and to wonder at its vastness. Therefore, when everything was done (as Moses and Timaeus bear witness), He finally took thought concerning the creation of man. But there was not among His archetypes that from which He could fashion a new offspring, nor was there in His treasure-houses any-

thing which He might bestow on His new son as an inheritance, nor was there in the seats of all the world a place where the latter might sit to contemplate the uni-

some words are freely broken, and others are wholly or partly set in small type. Reduced from 118 in. deep.

§81 · JUSTIFICATION

The justification of lines to fill an even measure is a mechanical necessity to the printer, whose page of type cannot be imposed unless it is a rectangle. The spacing out of the words across the whole width of the line, on the other hand, is a convention of doubtful value; it is necessary neither to the printer nor to the reader. The convention is so strong that it is nearly always observed, even when excessively wide and uneven word-spacing results; if the words are not spaced out to fill the line, the right-hand edge of the page will, of course, not be neatly aligned, but narrow and even word-spacing, whatever the measure, will become possible (figure 17). It is possible that lines of a precisely even length are an aid to reading, and that the to-and-fro of the eyes is comfortably rhythmic if each line presents an exactly equal field for the attention. On the other hand, verse, and long passages of curt dialogue, in which the lines are even only at the left, can be read without difficulty. Certainly justification (in the sense of spacing out the words to fill the line) is a powerful influence against a more general use of narrow measures and against close and even word-spacing, practices which most typographers agree are aids to legibility, and it is actually the cause of the awkward and unsightly custom of dividing words.

Major innovations in book typography are perhaps best introduced with subtlety, even with stealth, and readers should be gradually inured to new styles. When the text is run round illustrations, for example, and the setting beside the illustrations is in a particularly narrow measure, few readers would object if the narrow-measure setting were unjustified, particularly if the illustration had no obviously rectangular shape which would emphasize the irregularity of the type. All too often, in this kind of setting, letter-spacing within words is used to fill a narrow measure.

§82 · INTERLINEAR SPACE

Adjusting the space between the lines is a particularly delicate problem. The modern tendency in composition is towards close word-spacing and a certain amount of interlinear space. This emphasizes the separate existence of each line; in the early days of printing, before leads were placed between the lines, the page had the appearance of a closely-woven texture. Most readers now prefer some leading, and quite unprejudiced people will refuse to begin a book if the text presents too solid an appearance.

Once the reader has begun to read, the spaces between the lines have their own value. Legibility depends not only on being able to see the strokes which make up the letters, but on being able to see at a glance the positions of these strokes in relation to each other. If there is too much or too little space within or between the letters, the positions and shapes of

the strokes become confused, and the letters less easy to identify quickly. The same is true if the adjacent lines of letters, above and below that on which the eyes are focused, are too close; crowding into the area of attention, they distract the reader from the right object of his regard. Excessive leading, on the other hand, seems to diminish legibility.¹

The greater the number of ens in the line, the more the interlinear space should be; this is generally agreed among typographers. The reason is believed to be that an extremely wide measure causes some difficulty in picking up the beginning of the next line at a glance, on returning from such a distance, and may lead to 'doubling', or beginning the same line twice. Even if this is not a common experience, wide measures without proportionate leading may well cause hesitation and a slowing down of reading.

Several factors influence the choice of leading. Before leads were ever used in text composition, type was set solid, and as a rule the roman letter had extenders long enough to hold open an adequate channel of white between the lines. This century has seen the introduction of type-faces in which the extenders have been cut short in varying degrees; if such types are set solid, the lines will be too close together. One function of leading,

Concern for good book production today is not confined to publishers and printers. It extends to the general public, whose interest has been stimulated not only by the generally improved standard in the books they buy, but also by exhibitions and by an increasing literature on the subject. And a discriminating public is the best possible guarantee of the continuance of good printing.

H. G. ALDIS

A setting in Times, showing inadequate leading.

then, is to compensate for the abbreviation of the extenders of a letter which is large on the body. The x-height of 11-point Monotype Times New Roman, for instance, is almost exactly the same as that of 14-point Centaur; the extenders of the former are abbreviated, those of the latter are of classic length. In a narrow measure, Centaur may reasonably be set solid, since the extenders will hold the lines apart. In order to bring Times to equal terms, three points of leading will be necessary (or, in text composition, it will be better to cast 11-point Times on a 14-point body).

The modern tendency towards extra space between the lines has already been mentioned. Except when founts with the longest extenders are set in the narrowest possible measures, a point of leading will always be a benefit to the reader of today. Even in such narrow measures, an extra $\frac{1}{2}$ -point (if practicable) looks well with series with medium extenders, and those with short extenders need an extra point.

In the opinion of some typographers a loosely-fitted fount needs extra space between the lines. Loose fitting is a fault in type, and fortunately not many designs suffer from it, but when it does appear it prevents close word-spacing. The space between words must be obviously wider than that between letters; and if the page is to appear to consist of a series of lines rather than of irregular patches of letters, the space between lines must appear to be greater than the space between words.

Maximum and minimum numbers of ens per line for normal setting have already been suggested—70 and 40 ens. Half-way between these two-55 ens-might be described as a good medium length for a line. In a line which contains this number of ens, a well-fitted type which is small on the body-Bembo, for instance-and which has been set with close word-spacing, should not need more than a point of lead. A line of 70 ens may need another point or so, and a longer line still more; no firm rule can be laid down. One formula that may be of use is based on a measure which requires no leading—say one of 40 ens. If the fount to be used is 11-point Perpetua, and the measure such that it will contain 40 ens, no leading will be necessary (since the measure is narrow and the extenders long). If the measure is increased to one which would contain 40 ens of 12-point Perpetua, then 11-point Perpetua when used in that measure should be cast on a 12-point body. If the measure would contain 40 ens of 14-point Perpetua, then 11-point Perpetua when used in that measure should be 3-point leaded; and so on. Another suggestion is that the vertical space between short letters should be roughly half as much again as the lowercase x-height.1

To separate paragraphs from each other by extra leading is a bad habit which leads to pages of uneven depth, and prevents consistent 'backing-up' of the lines of text (§ 136). If extra space between paragraphs or sections is essential, it should be specified as a whole number of white lines. In the same way, of course, the lines on two facing pages should align with each other.

§83 · INDENTION

New paragraphs are usually indented one em of the text fount, and for most pages this is enough. If the measure is unusually wide, however, and particularly if the lines are closely set without much leading, $1\frac{1}{2}$ ems may make the paragraphs easier to pick out. Monotype operators are trained

to increase indention to $1\frac{1}{2}$ ems in measures over 26 picas. If indention is not used, the typographer will have to find some other means of indicating the start of a new paragraph, such as a drop initial or a paragraph mark—¶.

§84 · SPECIAL SETTINGS

So far, it has been the design of ordinary prose for sustained reading that has been described. The typographer must also be ready to design a text form suitable for different uses, such as poetry (which may be read more slowly); drama (in which a pause may reasonably be suggested between the speeches of different characters); reference (where only brief extracts may be read at one time, and where speed of reading may be less important than accuracy and economy); and reading aloud (where the reader's eye may travel slowly and take in only one word at a time).

In the next three sections the problems of some special settings are discussed.

§85 · VERSE

The borderline between prose and verse is not always easy to find. The rhythms and constructions used by some 20th-century poets are so subtly dissimilar from those which commonly appear in prose that if certain kinds of verse were set in the manner of prose only an expert could tell the two apart. To the reader, the most obvious difference between all prose and all verse is that of style in composition. Prose is set in sentences which follow one another within a paragraph, and its lines are justified by uneven word-spacing to fill an even measure; verse is broken up into lines which are rarely exactly equal in length, each line usually beginning with a capital, and the word-spacing being even throughout.

In choosing a type for verse, those series are to be preferred in which the capitals are neither tall nor bold in comparison with the short letters, if each line is to begin with a capital. Plantin Light, for instance, has capitals which are both shorter and lighter than the average. This prevents the vertical line of capitals along the left-hand margin from appearing unduly emphatic.

The set of the fount chosen should be such that the measure can accommodate all, or very nearly all, the longest lines. The shape of the poem on the page probably helps the reader to recognize its rhythmic nature and its rhyme-scheme, if any; and if more than a very few lines have to be turned over (broken in two), the shape of the poem becomes confused. For verse which contains long lines, then, a narrow-set type will be best. If there are

¹ The Monotype keyboard operator's manual (National Committee of the Monotype Users' Association, 1950). Figure 6, § 14, shows a setting without paragraph indention.

HYMNOS AAN DE ZEE

Naakt als ziel tot ziel Kom ik, Zee, tot U. Aardsche bloesem viel, En mijn oogen schuw Voor Uw klaren dag

Dekken zich met eigen bloesem, blanken godgeleenden lach.

Voor den avond heeft Ziel 't bizonder kleed; Heel heur leven weeft Haar doodswâ gereed, Maar wat zij ook spon,

Tot U komt ze als die in wolken treedt voor 't aangezicht der zon.

Zij die achter lach Zich het liefst versteekt, Soms maar aan den dag Noode in tranen breekt, I]lt zoodra gij noodt,

Altijd naakt en altijd lachend tot Uw lustenloozen schoot.

Zee, welk zoet geheim Weet ik met U saam, Dat als rijm op rijm Als vleinaam op -naam Op Uw zonnelied

Ziel met zachte lachen antwoordt, peinst en weet het niet?

Zee, welk wonder ding Nooit in droom verbeeld Hel als gouden ring Uit Uw diepten speelt, Dat in zekerheid

Ziel het wacht en ledig gaat, en keert weêr even blijd?

lines which are much longer than the rest, then a clear and consistent treatment for them, whether turned over or not, will have to be found (figure 18).

Since verse is not justified to fill the measure, the designer has the opportunity of specifying the word-spacing. Monotype keyboard operators are usually trained to use 6-unit spaces between words in verse, which is approximately equal to a thick space. This is rather more than is necessary with most founts, and the use of a fixed space of 5 or even 4 units may be preferable. There is no obvious reason why verse should be word-spaced differently from prose, apart from the fact that fixed instead of variable spaces can be used; there may, for instance, be very little difference in general appearance between a page of blank verse and a page of prose set in a narrow measure. Figure 4, § 8, is a good example of closely spaced verse.

Pray but one prayer for me 'twixt thy closed lips,
 Think but one thought of me up in the stars.

The summer night waneth, the morning light slips,
 Faint and grey 'twixt the leaves of the aspen,
 betwixt the cloud-bars,

That are patiently waiting there for the dawn:
 Patient and colourless, though Heaven's gold

Waits to float through them along with the sun.

A sonnet set in Bell. The stanza above has 4-unit word-spaces, that below has 6.

Far out in the meadows, above the young corn,

The heavy elms wait, and restless and cold
The uneasy wind rises; the roses are dun;
Through the long twilight they pray for the dawn,
Round the lone house in the midst of the corn.

Speak but one word to me over the corn,
Over the tender, bow'd locks of the corn.

WILLIAM MORRIS

¹ The Monotype keyboard operator's manual.

² It is sometimes suggested that verse should be more widely spaced than prose in order to induce slower reading. But Belloc's poem *Tarantelle* would lose by slow reading, just as Sir Thomas Browne's *Urne-Burial* would lose by fast.

Extra leading is sometimes recommended for verse, but here again there is no apparent reason why verse and prose should be differently arranged unless the lines of verse need to be treated as more separate from each other than lines of prose. Verse indeed tends to have shorter lines than prose, and may therefore look well enough with slightly less lead.

Indention is very much more important in the composition of verse than in prose—it is so important, in fact, that the author should be consulted if there is any doubt (and if the author is within reach of consultation). Blank verse and couplets need no indention as a rule; their rhythm and rhyme-schemes are regular, and so is their appearance on the page, most lines being of fairly even length. Convention permits almost any kind of verse to be set flush at the left, but certain verse-forms are better indented. Where there is a regular pattern of longer and shorter lines, the shorter lines are often indented to warn the reader not to expect the same number of syllables as in the longer lines. The 18th-century poets who closed a series of rhymed couplets of iambic pentameters with an alexandrine liked to indicate the change of metre with a brace, linking the alexandrine to the couplet with which it rhymed. A brace would look rather old-fashioned now, and alexandrines are no longer in vogue; but the principle of signalling a change of direction in a poem as in a motorcar remains a good one. Indention may also be used to indicate the rhymescheme, or to adjust the emphasis on certain lines. The indention of shorter lines will also give the poem an appearance of balance on the page (figure 4, \S 8, and figure 18).

Capitalization is particularly important in the setting of verse. The convention that each new line should begin with a capital letter is an old one, and is maintained even by exponents of vers libre. The intention may be to emphasize the rhythmic nature of verse by reinforcing its separation into lines, or to distinguish verse from prose. Separation into lines should, however, be quite enough to distinguish one from the other. In some verse, particularly the rhymed couplets of the 18th century, the lines may be 'end-stopped', and the reader may reasonably pause at the rhyme; but where there is no natural pause of this kind, the capital may well fall quite awkwardly in the middle of a sentence, and on a word which may not deserve more emphasis than its position at the beginning of a line confers.

In most books of verse the length of line varies drastically from section to section; both in collected works and anthologies, for instance, the line may contain from ten or more syllables to five or less, according to the metre used in different poems. Each poem may therefore have to be placed individually on the page. As a rule, the operator who composes the text will do his best to centre each poem optically within the measure, but the imposed proofs may require attention from the designer.

§86 · DRAMA

The design of prose or verse does not necessarily change when either or both appear in a play. The peculiarity of drama setting is that the names of speakers need to leap to the eve which is in search of them, and that these names, as well as stage directions, scene numbers, and so on, are best set in a manner distinct from that of the main text. Setting the name of each speaker in a line separate (or broken off) from his speech makes this possible, and allows of regular and handsome composition. There is room to spell out long names in full, so that even ANTIPHOLUS OF SYRACUSE need not be abbreviated to ANT.S. Names may also be letter-spaced if necessary. In verse the first line of the speech is not forced out to increased length by the inclusion of the speaker's name, and the speeches of the various characters are separated from each other by the names. This style, however, greatly increases the number of lines occupied by the play; and, if the names are centred, and so almost surrounded by a mass of text, they may not be conspicuous enough. This last objection might, of course, be overcome by starting each name one or two ems farther left than the main text.

For economy in space the names will usually have to be set in the same line as the speeches. In verse this will usually entail abbreviating some names, and to economize in space the names may be set in upper and lower-case italic; this, however, may lead to their being confused with the stage directions, which will probably have to be set in the same style. If the speaker's name begins one or two ems farther to the left than does the main text, the name will be easy to pick out, and in verse the first line of the speech will not be unduly lengthened.

Stage directions are usually set in italic, so that they may be distinguished from the main text. Directions which appear in the text are often enclosed in square brackets, though if they are at the end of a speech the second bracket is often omitted. Parentheses will do just as well, unless the author uses them in speeches. If the text contains a number of quotations or foreign phrases set in italic, the directions may need to be firmly differentiated from the text; they might for instance be invariably enclosed in brackets and preceded by an em rule. An alternative style, which increases the clarity but also the length of the setting, is to set all but brief stage directions in separate lines; they may for instance be indented one or two ems, or placed directly under the point at which they would appear if set in the same line as the speech.

§87 · TWO-COLUMN SETTING

A dictionary or other reference-book may contain great numbers of brief definitions which would fill only part of a line of medium length. To prevent much of the page being wasted in white space at line-endings, an extremely narrow measure may be used. In the longer definitions the spacing may be rather uneven as a result, but this will be comparatively unimportant, since a book of reference is not used for sustained reading. Dictionaries are usually set in two-column pages, with the columns close together and usually separated by a vertical rule.

A two-column setting may also prove extremely useful for a particularly long book for sustained reading. A quarto format is often chosen, since its greater proportionate width gives room for a double-column measure. The treatment of margins should be as for single-column pages. A small, narrow-set fount is to be preferred, and if the number of ens in the line is small enough very little if any leading will be necessary. This will make possible the use of quite a narrow space, such as 6 points, between the two columns; deeper leading may necessitate a wider inter-column space. A fairly solid text is the most suitable for this treatment; one which is broken up by short lines of conversational exchange may have a confused appearance in two columns, owing to the varying space between columns. The use of a rule between columns will of course clarify the division, and make possible an even narrower gap; this method may, however, be considered to produce a crowded page, and the narrowness of the gap may distract the reader slightly.

There are, of course, other kinds of text composition; the setting of foreign languages, for example, of infant readers, of the Bible, and of mathematics must all be approached as different problems. The purpose of the text must be borne in mind when its design is planned.

BOOKS

STEER, VINCENT - Printing design and layout: the manual for printers, typographers and all designers and users of printing and advertising . . . - Virtue: 4th edition, 1951 - quarto: illustrations: bibliography. [A comprehensive guide, but not written primarily for book designers.]

See also, after chapter 1, JENNETT, ROGERS, and SIMON; after chapter 2, CHAUNDY; after chapter 5, DE VINNE (Book composition); after chapter 7, BIGGS (Use of type) and PYKE; and, after chapter 8, UPDIKE.

Details of text design

A page in which the words and lines are effectively disposed within well-proportioned margins may still be spoilt by a faulty arrangement of details. Some of these details may be regulated by the typographer, others by the printer. Many of them form part of 'house style', that set of rules set up by a master-printer for his compositors to follow unless otherwise instructed. House style is by no means uniform throughout the printing trade, and leading book-printers may differ quite radically. At the University Press, Oxford, for example, quotes are single round a quotation, double round a quotation within a quotation; until quite recently Cambridge practice was the reverse:

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"This was my 'house style'," says Cambridge. 'And this', says Oxford, 'is my "house style".'2
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Printers with established traditions and strong preferences are entitled to observe their own house styles, although usually prepared to consider contrary suggestions. Keyboard operators who are left to follow the house style to which they are accustomed are more likely to be consistent than those who have to bear in mind a style which varies from job to job; when a book is set by two or more operators, their consistency is maintained by observance of the house style.

The typographer needs to be familiar with the house style of every composing room with which he deals. He may wish to suggest a practice contrary to the style, or he may find that a point on which the compositor will need guidance is not mentioned in the set of rules.

From careful study both of codified house styles and of the typescripts

¹ Perhaps the most widely used example of a codified house style is HORACE HART'S Rules for compositors and readers at the University Press, Oxford. Much of this valuable little book is occupied by matters with which the designer is not concerned, such as spelling, hyphenation, and word-division. Other sections, however, deal with points of style on which he may wish to have some say; these include the use of capitals and small capitals, spacing, italic type, punctuation, and figures and numerals. Many of the finer points of text composition are admirably dealt with by OLIVER SIMON in his Introduction to typography.

² But COLLINS's Authors' and printers' dictionary (Oxford University Press), another authority on style, preferred the double quote until recently reset.

he prepares for printing, the typographer can compile a 'house style' of his own. This may contain a *short* section of points of style about which he feels so strongly that he means to insist on all occasions on his own style for them; a larger section of usages he prefers, and may suggest if the printer's style is contrary to his preference; and a section of details which he has found may be overlooked.

An elaborate set of conventions has grown up during 500 years to regulate text composition, and most difficulties settle themselves within the printing-office. In the rest of this chapter, however, some of those points are mentioned which the typographer may wish to consider, to see whether the house styles of printers and established conventions provide answers of which he approves.

§88 · PUNCTUATION

To a large extent the *use* of punctuation is governed by convention, and is the business of author, editor, and compositor rather than of the typographer. Instructions about the *style* of punctuation, on the other hand, may have to be given by the typographer, as the omission or insertion of some punctuation marks is a matter of style rather than of grammar.

A number of the punctuation marks inserted in some kinds of setting by literal-minded authors or compositors, or according to strictly logical house styles, could reasonably be omitted. Where punctuation marks can be left out, they should be; if they are not essential, they are valueless, and may even be pernicious. Collins puts forward as a principle of punctuation: 'Omit every point that does not make the meaning clearer.'

The full-point is the most obvious example of a mark which is apt to lose its force if used too often. Its chief purpose is to indicate the end of a sentence; when it appears within the sentence as well (for instance, after an initial letter or an abbreviation), the end of the sentence is less distinct than it should be. The text may also appear to be so frequently interrupted, if there are many full-points within sentences, as to be forbidding to the reader.

The typographer must, however, be careful not to make the text less easy to understand by economy of punctuation. An instruction to omit the point after all initials, as in BBC, may for instance lead to such ambiguities as DORA and MICE.

That punctuation should as far as possible be so spaced as to maintain the text's appearance of close and even spacing is now generally agreed. The tendency of 19th-century compositors was towards more than ample space—an em or even more between sentences, for instance, and proportionately wide spacing round marks of punctuation. Some printers of

- Yes, sir.
- Why was that?
- My instruction was overlooked, sir.
- A written instruction?
- Yes, sir.
- If there's one thing above all that I hate, it's to promise a man for nine o'clock and deliver him at eleven o'clock. That means you had to send the car, I suppose?
 - Yes, sir.
 - Did you make a note of it yourself?
 - No, sir. But I remembered it as soon as I saw the man.
- It was pure accident you saw the man. He might have been out working, you might have been out yourself.
 - Yes, sir.
- Next time make a note of it yourself. You can't leave such matters to a sergeant.
 - Very good, sir.

The captain went out, but he had hardly taken two paces in the passage before he returned.

- It's the one thing above all else that I hate, he said. Duty's duty, and it must be done. One can't put such a thing on to another man.
 - Yes, sir.

So the captain went again, and came back again.

- Someone will have to pay for the car, he said. I suggest it's fair that you divide it between you.
 - Very good, sir.

And this time the captain went out and did not return. And when the lieutenant was sure that he would not return, he sat down in a black and angry rage, for never before had the captain spoken to him like that. He thought he would go to the captain, and refuse to pay, because he had given a written instruction, and what more could be done than

today have gone to the other extreme, placing all punctuation marks hard up against the words they follow. This perhaps is rather too tight; in continuous setting, the punctuation marks will not be distinct enough from the rest of the text. A successful compromise in Monotype composition is to separate punctuation from the preceding word by casting the marks on a slightly wider body than usual. The colon, semicolon, and exclamation mark, for instance, are usually cast on 5-unit bodies; if they are placed instead in the 7-unit row of the matrix-case, the extra two units will appear to the left of the punctuation mark. In Times New Roman, in fact, this is the normal arrangement of the punctuation.

The forms in a simpler sentence are:—Exclamation: What I have suffered!; Question: What have I not suffered?; Exclamation with inversion: What have I suffered!; Confusion: What have I not suffered!

The setting above is in Plantin, with punctuation close up against the words; that below, in Times, with spaced punctuation.

The forms in a simpler sentence are:—Exclamation: What I have suffered!; Question: What have I not suffered?; Exclamation with inversion: What have I suffered!; Confusion: What have I not suffered!

Typographers are apt to disagree about the correct spacing of the dash (or em rule); some prefer no space at all between the dash and the adjacent words, others a narrow fixed space, and still others a variable. Without any space, the dash appears to link words rather than to separate them; this style on the other hand does contribute to the close and even spacing of the page. If a small fixed space (perhaps two units from the Monotype unit-adding attachment, or one point on a line-casting machine) is enough to prevent this appearance of linking, it may be preferable to variables, which will tend to make the setting look loose. The typographer must, however, remember that in certain contexts the spacing of punctuation has its own significance. The dash has various purposes; for instance, when it is used to indicate an interruption it should perhaps be hard up against the point at which the interruption takes place, but separated from the first word to follow the interruption. Where it is used 'as a kind of intensified pair of commas or parentheses, before and after a parenthetical clause'i it should lie midway between the clauses it separates. An unusual use for a short dash (or en rule) is shown in figure 19.

§89 · CAPITALS AND SMALL CAPITALS

Hart and Collins are firmly agreed: 'When in doubt use lower-case' says one, and 'Avoid beginning words with capitals as much as possible' says the other. Although the old-fashioned habit of unnecessary capitalization persists, the use of as few capitals as possible is just as characteristic of good modern composition as the avoidance of unnecessary punctuation. Convention requires a frequent use of capital letters which cannot be avoided; but the typographer should always be on the watch for chances to use small capitals or lower-case letters instead.

Small capitals are sometimes used, for example, instead of capitals for the abbreviations of postal districts, particularly if old face numerals are used (EC4); the initials of titles of distinction (FRS, LLD); and for references to illustrations when they appear in the text (e.g. FIG. 15).

Lower-case might perhaps be used more often for all except the first word of titles of books, chapters, articles, and so on mentioned in the text, particularly if the title is a reasonably modern one, or particularly informal, unless one of the words in the title would in any case begin with a capital. This, however, is a distinct break with convention, and must be carefully done; capitals usually begin all important words in quoted titles.

§90 · EXTRACTS AND QUOTATIONS

Extracts and quotations more than two or three lines long are often broken off from the main text and set in a smaller fount. Another way of differentiating these passages is to indent them on the left or right or both, or to set them solid when the main text is leaded.

Changes of style of this kind during text composition do not make the act of reading any easier, or improve the appearance of the page. The typographer must decide whether extracts really need to be so emphatically differentiated from the main text, and this is a point which may be worth discussing with the author. In a book intended for sustained reading, to break extracts off from the text, enclose them in quotes, and indent the first line like a new paragraph should be enough, without any alteration in the style of composition.

If extracts have to be set in a type smaller than that of the text, the fount used for them should be two sizes smaller, in order to make obvious the difference between text and extract. The appearance of the page will not be spoilt if the same measure and proportionate leading are used throughout.

The typographer should do all he can to avoid having quotations set in a style he would reject for composition of the text. If the text measure contains a large number of ens of the text fount (say, more than 65), it

like their oxighbours to the west, the Oricital, Oricial, Aghoritis, Aoritise, Horatae or Nevirtal; they too were named after a rive, it has too were named after a rive, it weath boundary. Nest on the west came the coan of the Fish-Eaters, alland of whom lived the Gedrosol or Galrosol or Kedrosol. Grandlo ki, join at Jask, which may perhopi be taken as the sostern boundary of Herodonus' Persion, for he included the Germanians (Carmanians) among the Persion tribas (1.125).

0.1 0.2 PROVINCE XVIII Na Persian equivalent for this pro-vince is known. For the Motionions se 1. 72. 189, 202, for the Sospetres, 1, 104, Alarodioi stems to be another form of the names Ararat and Urariu. After the fall of the kingdom of Urariu most of its population was merged with Aryan in-radersto formthe Armenians (n. 20n . 14); Darius' Armenianziral, who called himself Nebuchodnezzar, had an Urarisonname (Lehmann-Haupt, Armenien einst u. jetzt, II, p. 162). The Alarodians must have lived north-east of the Atmenians, in the neighbourhood of the modern Mount Arbrat, which seems to have received its name by transference from some more southerly range, perhops as a result of the transference of the Urariion name from Armenia to Alarodia. The word Urariu is last found in its old sense on a Bobylonion tables of about 415 B.C., which refers to a commander of troops from Urashtu and Mclida (Armenia and Melitene); he and his Sosher both have Boby lonian n (Univ. of Pennsylvania, Bab. ection, Legrain, siv, no. 995; Unger, Babylon, p. 40, n.). 94 . J PROVINCE XIX

The Matchisectus have been related to the Phyglann, Jorning another termanately the Muthlé (n. 2 or 1. 14); apart form a Bobylanion test on woldiers of the Muthhai (2 Motchi or Mylan) in Matapotamio during the fifth century (n. on 1. 104), nothina tource. In Georgianthe Atmentant or called Somekhta and their country Somkhitt, and an allusion to the Motchi may lie hidden in a Georgian statement that Samc'khe

rated to pay two hundred talents. This was the eighteenth province.3

The Moschi, Tibareni, Macrones, Mossynœci, and Mares had to pay three hundred talents. This was the nineteenth province.³

The Indians, who are more numerous than any other nation with which we are acquainted, paid a tribute exceeding that of every other people, to wit, three hundred and sixty talents of gold-dust. This was the twentieth province.

and 95. If the Babylonian weight of silver here spoken of be reduced to the Euboic scale, it will make nine thousand eighthundred and eighty such talents; and if the gold be reckoned at thirteen times the worth of silver, the Indian gold-dust will come to four thousand six hundred and eighty talents. Add these two amounts together, and the whole revenue which came in to Darius year by year will be found to be in Euboic money fourteen thousand five

was inhabited by Meskly-nl (Waushe, Géog.ed. Brower, p. 76: noted by Dr H. W. Bailey). These Tiboreni may represent the Tubal or Tibal of the Assyriansand Jows ; In which case they had moved northwards since Assyrian times, when they were in the Tourus mountains, next to the Cilicians. Their name resembles place-names of the Urartian and Cilician areas (Wolnwright, J.E.A. arii, 1931, p. 42 n. 1). A fragment of Hecotorus enumerates the Black Sea tribes from the Phasis to the Ther; modon, in order of their geographical position, as Marcs, Matranes, Mossynasci and Tibareai Further inrmation on the Afares comes from Herodotus (vil. 79), the rest are barely known apart from Xenophon, who describes the habits of the Mossynact and Tiboreni (Anabasis, v. 4.5; iv. 8 for the Alacrones). In his time (400B.C.), the Persians had no control over the set ribes. Darius man have regarded them as part of Cappodocia, for the later name Pontus came to be applied to the north-cast coast of Asia Minor, because of the division of the Cappodocion surrapy into a Pontic and a southern province. This might, therefore, be the Puntiya of the Persian lists (n. 1 on

94 • 4 PROVINCE XX

Cyrus had conquered as far as the borders of India (n. on 1. 177), and a philological identification of the nomes Sassagydian and Punjal would bring us to the later limits of the empire (n. 3 on 91). The prorince of India (Hindush) beg the Indus and probably ended at the Hyphosis (Beat), for a people living beyond the river serred the Persia ies (Tarn, J.H.S. xlill. p. 99). It thus corresponded to Sind and the Western Punjab, besides the Indus plain from Kolabagh to the seo. Some Indians were still subject to Persia when Alexanderarrived but they probably lived outside this pro rince (n. 1 on 94, 1 on 98; for the gold, 106; Cambridge History of Indla, ed. Ramon, 1, p. 319; Carolgnac, Histoire du Monde, 111, de lo Vallée-Pousin, L'Inde Jusque vers 300 av. J.C.; for Indian debt to Persia, Fábri in Mélanges Linossier and Journal Asiatique, ccaril, 1930, p. 298).

95 . 1 REVENUE OF THE

The MSS. state the total of the silver revenue as 9540 Euboic talents, but In the Dabylonian weight the silver total amounts to 7600 talents, from

304

hundred and sixty talents, not to mention parts of a talent.*

② 96. Such was the revenue which Darius derived from Asia and a small part of Libya. Later in his reign the sum was increased by the tribute of the islands, and of thenations of Europe as far as Thessaly. The king stores away the tribute which he receives after this fashion—he melts it down, and, while it is in a liquid state, runs it into earthen vessels, and when a pot becomes full, he breaks away the earthenware, leaving the metal in a solid mass. When money is wanted, he coins as much of this bullion as the occasion requires.¹

297. Such then were the governments, and such the amounts of tribute at which they were assessed respectively. Persia alone has not been reckoned among the tributaries—and for this reason, because the country of the Persians is altogether exempt from tax.¹ The following peoples paid no settled tribute,

which should be subtracted the 140 expended in Cilicia. The resultant 7,460 salents work out at 9380 Exhorian salert into the Euboic telents—commenting the Bubylonian salert into the Euboic telents—of 60 lbs. (mixe) on a beats to 1678 Euboic lbs. to each Babylonian silver tolent (n. 5 on 89). The addition of 4680 Euboic telents makes the required total recenue of 14,560 Euboic telents makes the required total recenue of 14,500 to be total onto the recent of 131: 11 intend the varied of 900 to silver appears to be wrongly natud at 13: 11 intend of 131: 1 (n. 5 on 89): the ratio rounderably in classical times but these figures apply to the legisining of Dariul' right.

The annual recense of some LA,500,000 (at gold portry) may some modest, but it must be renembered that very little administrative expenditure was men from this true, most of which in peace time would be reprine to the Persian ruling claus or allowed to accumulate. The elight express of an oriental administrative spaces were poid by local governors, who took their own radired from the toase they imposed and reactived a special roble-allowance for their staff and numerous hongering (n. on. 1, 1921). On the onelogy

of conditions in oriental cou recent times, the amount collected annually by the local outhorities may harecome to roughly £30,000,000; two generations after the fall of the empire Egypt produced a revenue twenty times as large at the tribute paid according to this list. The fifth-century Throcian empire collected 400 talents a year, but largely from tribes previously untaxed. Com-parison with later empires, even parison with later empires, even though taxed on the same principle, has little significance owing to changes in the value of money, but it may be worth mentioning an estimate that the Romans collected over £1,500,000 a year, while the Turks in 1780 collected less than £3,000,000; the Egyptian reven ndred years ago a about the same, but the Persian revenue in 18.88 came to over £1,500,000 (Andreades, Hist. of Greek Public Finance, 1, p. 95; Curzon, Persia, II, p.

481)
96 • 1 PERSIAN TREASURIES
Alexander is calimated to have found
175,000 tolents (L40,000,000) in
the Achaemation treaturies, theequivalentof somethiteen years' tribute.
In the Persia of 1888, which covered
much smaller area thon the old

Persion Empire, and had a revenue half as large, the Shah added an overage of L100,000 each year to his hoards in had on annual surplus of L400,000 each year to his hoards he had on annual surplus of L400,000 eare espendisure (a quarter of the total revenue), but spent more of his sum on his court (Curron, Persis). The Achaemelous spent fifteen Babylonian toleusi dally on the court and thesteraglio according to a Greek estimate (Hesacleidar of Gumar, ft. 4, Athan. sti. 517), at which rate half the onnual revenue of the empire was spent at court. The regal treasurist also contained archives, and stores of weepons, capexy, tunture, clothes and purple clash (Longinus, On the Sublime, 4).2, from Thapopmpus; Plutarch, Au. 36). Dinos says that post of Nile and Danube water were alsostorichtere (Plut. Alex. 36).

97 • 1 PERSIAN EXEMPTION FROM TAX

The tribute of ancient empires was a payment made by captive countries to their conquerors, and proctically all Persians were therefore exemp (n. 2 on 93). The kings, however, regarded the Persians as one of their subject peoples; their represe stands first among the symbolic fig-ures that support the throne. Persians acknowled and their subjection to the king by giving him presents of such value as they could afford; Alianre-cords an anecdote of a poor man who lifted water in his hands saying: "My King, I honour you with the water of the river» (V.H. 1. 31. 33). The entire population of the empire was obliged to send presents at fixed times, when the various notianal emissaries formed the procession sooftenrepresented on Persepolis teliefs (Breasted, National Geographic Magazine, 64, p. 381; Sarre and Herzfeld, Iran. Felsrelief a. pls.). One such occasion was the New Year festival, held at the vernal equinox, and another prob-ably was the king's birthday. On these two days, the Mongol khans, too, received presents from the whole of their empire (Matca Polo, il. 14, 15), while the New Year is still celebraud in Persia by the giving of presents, though the patron deity of the by Islam (n. 3 oni. 133; n.on lii.

the notes, the section number is separated from the note number by a Centaur asterisk, centred. The make-up is symmetrical across each opening, but many openings differ from their neighbours. Reduced from 11 & in. deep.

will contain too many ens of a fount two sizes smaller. The leading of extracts will have to be adjusted as carefully as that of the main text. Some latitude is however possible when quotations are comparatively short.

§91 · NOTES

Notes of any kind are usually set in a fount not less than two sizes smaller than that of the main text, so that the difference between text and notes will be clear; when this is done, there is no need to use rules to separate the notes from the text, unless the text includes quotations set in a fount similar to that used for the notes. If the area occupied by notes is equal to or greater than that of the text, there is some risk that the notes will seem to be darker and more emphatic than the text: the smaller counters add to the colour of the setting. Certain series too have small founts which appear to be heavier than the larger; Monotype Scotch Number I is an example. In such an instance, a smaller fount of another and lighter series might be used. Ideally, the origins of the two series should perhaps be related to each other as closely as possible in time and place, in order to maintain harmony of design; or the notes can be set in contrast with the text by the use of two series of widely differing origin (figure 20; and see also figure 17, § 80, for a translation set in a contrasting fount).

The last paragraph of § 90 also applies to notes. Notes, unlike quotations in the text, can be set in double column under a single-column text; any note which contains less than four lines can be centred in one column within the text measure. Notes should not be allowed to encroach into the margins specified by the designer unless he has allowed room for them. Reference to the notes will be easy if each begins a new line, except when notes of only one or two words are set two or more in the line.

For most books the ordinary footnote is adequate, and it is certainly the easiest to set and make up. The author may, however, have many brief comments or explanations to make, and may wish them to appear beside the passage to which they refer, so that the reader will not have to carry his glance right down to the foot of the page. Marginal notes may then be used; these are usually placed in the fore-edge margin, unjustified and aligned at the edge next to the text. Notes set in this style are not unsightly, but they do tend to require particularly wide fore-edge margins, much of which may be wasted, and the hand-work entailed in make-up tends to be expensive.

Cut-in Cut-in notes, set within the text area in the space left by notes some lines of text being set in narrow measure, are rarely used nowadays, although they may have a neat and even decorative effect. Notes and text can quite easily be set separately on the machine, though

the pages have to be made up by hand; but the frequent alteration in the measure of the text tends to disturb the rhythmical action of reading.

Lengthy notes are always apt to be a problem, and one possible solution is to relegate them to the end of the book or chapter, where they can all be set together, perhaps only one size smaller than that of the text if they are important. Notes which are essential to the text should not, however, be separated from it.

Where there are never more than six notes to the page, the notes may be keyed to the text by the traditional index-marks, such as the asterisk. These are, however, rather conspicuous, and superior figures are usually preferred; there may be some difficulty in finding superior numerals to match an old face series. If the notes are keyed to the text and set together at the end of the chapter or book, the key numbers may have to exceed nine per chapter; this will lead to the use of double superior figures, which are to be avoided if possible, partly because of the unsightly gaps that open in the text below them.

Too many index-marks of any kind on the page give it a very forbidding appearance, as well as interrupting the reader, and they should be avoided if possible. One method of doing so is to number the lines of the text by fives, and key the notes at the end of the chapter or book to the text by a reference, in the note, to page and line number and to the relevant word or phrase. Another is to run the reference to notes on with the text, in a manner as inconspicuous as possible—for instance (note 265).

§92 · HEADINGS

Headings are always set in an alphabet or a size different from that of the text, to prevent confusion between text and heading; when roman upper and lower-case are used, they are usually two sizes or more larger than the text, so that the difference will be obvious at a glance. Capitals alone, capitals with small capitals, or small capitals alone are commonly used; italic capitals and italic upper and lower-case are also useful, and italic small capitals may be useful if they are available. Headings which are broken off from the text may be set in a fount or even a series different from that used for the text; but those which run on with the text should be set in an alphabet from the same fount, or in a related alphabet such as bold of the text size, to prevent difficulties of alignment. If headings need more emphasis than usual, bold type may be useful. Headings which are broken off from the text have no need of a terminal full-point.

The treatment of chapter headings depends first of all on the space available. If the text of the book is unlikely to be revised, the beginning of a new chapter may follow the end of its predecessor on the same page; this

is a particularly apt style when the author has made little of the chapter-heading, perhaps giving the chapter a number but no title. In any case, if the chapters are to follow each other like this, a fairly compact style of heading will be needed; there may not always be room for much vertical space between chapters. (It is a point of good typography that the distance between chapters should be the same throughout the book.)

If the division between chapters appears to have rather more importance—for instance, if each chapter begins with a number, a title, and a quotation or a summary of contents—or if the text may have to be revised, each chapter should begin on a new page. This will usually allow the author to add at least a few lines to a chapter without disturbing the pagination of the rest of the book. The typographer has then to decide on the extent of the drop—the number of text lines by which the first page of the chapter is shorter than a full text page. A long drop may cause the text area below it to become a square or a wide oblong, uncomfortable shapes for a tall oblong page; the drop should not, however, be so short that the chapter head is cramped. Whatever the drop, it should if possible be the same throughout the book, or should at least appear to be the same; this may not be simple if the chapter titles vary greatly in length (and therefore in depth on the page).

In planning headings the designer should bear the purpose of each in mind. The typographic form of each should be appropriate to its literary importance; each should stand out adequately from the surrounding text (this is largely a matter of the amount of space above and below it); and if there are various kinds of sub-heading, their importance in relation to each other should be made clear by typographic means.

Cross-headings are used to divide a chapter into a number of parts equal in importance. They are usually centred within the measure, and separated from the text above, and sometimes from that below, by space. In style they should be less emphatic than the chapter-heads, and different from the headlines (§ 93), to prevent confusion. The main sections of the chapter, each with its cross-head, may be separated into subdivisions, each with a subordinate cross-heading set in a less emphatic manner than the main cross-heading.

Side-headings are sometimes used instead of subordinate cross-heads. They are usually separated by space from the text above them, and sometimes from that below, and are set at one side of the measure, usually the left, broken off from the text. The most common arrangement is to have one white line over the side-heading, to place the heading full out at the left of the measure, and to indent the first line of the text. This indention has a slightly untidy look, since it does not align with the heading, and may be considered unnecessary, as there is no need to indicate the

beginning of a new paragraph. If beginning the paragraph full out deprives the heading of some of its emphasis, both heading and paragraph may be indented equally.

Shoulder-heads are less noticeable than side-headings, because they are run on with the text instead of being broken off from it. They may or may not have space above them, may be indented or set full out, and may be either separated from the text, perhaps by a full-point and an em rule, or run straight into the first sentence.

A. CROSS-HEAD

B. The conventional style of side-heading

The first line of the paragraph is usually indented after the heading, although there is no need to emphasize the beginning of the new paragraph.

C. A neater style of side-heading

If there is some doubt about where the side-heads are to go in the text, all paragraphs may have to be indented when they are first set. When the side-heads are inserted, they too can be indented, so as to align with the first word of the paragraph below.

D. Shoulder-heads. These are reasonably neat whether indented or not, but indention makes them rather easier to pick out.

Three kinds of heading, set in Baskerville.

Cut-in headings and marginal headings are arranged in the same style as cut-in notes and marginal notes, and since they have the same disadvantages they are equally rare.

Other kinds of heading can, of course, be introduced if necessary; those mentioned are merely the most commonly used.

§93 · HEADLINES

Headlines are those headings which, appearing as a rule at the top of the page, do not introduce a new part of the book but repeat a heading or the title of the book itself. In a reference book they indicate the contents of each opening, by repeating the book and part or chapter titles, or the part and chapter titles, or the chapter and section titles, or any combination the author or editor or typographer may prefer. In a book designed for sustained reading, headlines help the reader to find his place on taking up

the book after an inferruption. Headlines may be the same in content and style on facing pages, or may differ from recto to verso.

The running headline is usually understood to mean a headline that runs unchanged throughout the book, and which normally consists of the book's title. It is worth using only for books of permanent value. These may have to be re-bound over and over again by libraries, and may be kept for scores of years by private owners. Running headlines minimize the risk of mislaying pages or sections when numbers of books are broken up together for rebinding, or disintegrate on the shelf; they do not assist the act of reading.

The section headline¹ consists of the titles of the book's subdivisions, whether chapters, parts, books, or other divisions. A headline which consists of the titles of subdivisions of chapters might be described as a subsection headline; in using this kind of headline, some care may be necessary to prevent its appearing directly over the subsection heading.

The page headline¹ refers only to the text which appears below it, and so has to be written by the author in page proof. Since it may require an extra stage of proof, delays the correction of proofs in page, and adds to the cost of composition, it is useful only when essential. In works of reference generally it may be valuable, but usually section headlines, perhaps reinforced by dates in historical books, are adequate.

To use a running headline throughout the book, without any variety, would usually be as absurd as to use nothing but page headlines. The best practice for most books is to use headlines to indicate the section and as many varieties of subsection as possible, without resorting unnecessarily to page headlines. If different headlines are used for recto and verso, the major heading usually appears on the verso and the minor on the recto. Author and editor naturally have the final word in the provision of copy for headlines, but the typographer may do well to remind them that headlines properly planned can be a very useful guide to the reader.

When a section headline appears over a page which contains a section heading, say about half-way down, the headline is usually made to agree with the heading. This is an old custom, but to make the headline agree with the immediately adjacent text appears to be more sensible.

The style in which headlines are set is a matter of choice. They should be distinct not only from the text itself but from any parts of the text; italic upper and lower-case of text size, for instance, should not be used for a text which contains much italic, whether in extracts or in single phrases. Since headlines are subordinate to the text, they should not be more emphatic; capitals of the text fount are quite big enough for, say, books larger than demy 8vo (since the size of the headline should be

¹ Terms used by SEÁN JENNETT in his The making of books.

related to the area as well as to the fount of the text), and for demy 8vo and smaller books, capitals smaller than those of the text fount are to be preferred.

When the headlines on facing pages differ in importance, as when there is a running and a chapter headline, they are sometimes set in different styles, such as small capitals for one, and italic upper and lower-case for the other. This is a logical arrangement, though it unbalances the facing pages and may complicate the typography of the opening.

In position the headline should not be too widely separated from the text, in case it looks isolated; 6 points of space is usually quite enough. Conventionally the headline is placed over the text, but in an unconventionally designed book it could fulfil its purpose just as well if tucked away at the foot of the page, and would be less conspicuous than at the head. The most popular lateral positions for the headline are centred in the text measure or flush with the inner margin; the position and style of setting of the headline, however, are among the points at which unconventional typography tends to depart from custom.

Headlines may have a certain decorative value, relieving and setting off a solid page of text, if for example well-designed small capitals are carefully letter-spaced, or if a particularly attractive upper and lower-case italic is used. No additional ornament is necessary, but in the more fanciful kind of book the typographer may wish to decorate the headline with a fleuron or rule or strip of border; before he does so he should consider whether this ornament will retain its charm after appearing on scores or hundreds of pages.

§94 · PAGE NUMBERS AND SIGNATURES

The printer's term for page numbers is 'folios', a term which also describes a format and a sheet of typescript. The terminology of printing contains several ambiguities of this kind, which can be evaded only by the use of non-technical terms. Since there is no harm in calling a folio a page number, the clearer term is used here.

Collins states plainly, 'Page numbers should be at the outside of the head margin, as this position facilitates reference when rapidly turning over the leaves.' If any use is to be made of the page numbers, there is probably no better position. Other positions are used, but—rightly—the page number is rarely nearer the inner edge of the page than half-way across the measure. Usually it is not farther out than the outer edge of the text, since if it appears in the fore-edge margin it may be uncomfortably conspicuous.

When headlines are used the page number is often set in the same line and fount, and placed between headline and fore-edge. This neat style is more economical than the position at the foot, where the rest of the line containing the page number has to be spaced out to full measure. The style of the page number often accords with that of the headline; if the latter is in upper and lower-case italic, for instance, italic numbers are used for the former. If letter-spaced capitals are used for the headline, the numerals of the page number may be similarly spaced; ranging numerals benefit more from letter-spacing than do hanging numerals. Care must be taken to match the headline and page number for height; ranging numerals usually match the height of capitals, old face numerals align with small capitals and lower-case letters.

When a book is printed in quad size, so that the rollers run up and down the page, page numbers which appear at the foot must alone bear the weight of the roller for a moment. In a long printing run this may lead to wear, and the page number may be flanked by ornaments or brackets to protect it for a while. When these become worn they may be removed at the end of the run (if the book is printed from relief plates) or replaced (if type is used). Even with these safeguards a page number in this isolated position is apt to print badly.

In a page which contains many numerals the page number may become confused with the text, unless it is enclosed in brackets or distinguished in some other way.

Conventional methods of page numbering originate from manufacturing methods rather than from the convenience of the reader. The preliminary pages, in the numbering of which changes may take place up to the last moment before printing, are often numbered with lower-case roman or italic numerals, starting with the first recto page on which anything is printed, or which precedes the first printed page if that page is a verso. Page I, in arabic numerals, is then the first (recto) page of the main text. The pagination does not usually include those pages, inserted into the text, which have not been through the press with the rest of the text, such as illustrations printed on different paper or by a different process. Such inserted pages are known as plates, and are numbered separately.

Page numbers are sometimes omitted from chapter openings, some preliminary pages, and so on, but the numbering continues as though the omitted number had been printed. The unnumbered pages are sometimes known as blind folios. The back pages of the book, such as appendixes, notes, and indexes, which like the preliminary pages are subject to last-minute alteration, are numbered in the same style as the text, since to alter their page numbering would only entail altering that of the few following pages.

This conventional system of page numbering, which if intelligently handled need do nothing to impede the reader and can do much to aid the bibliographer and re-binder, is closely linked with the sections, usually of 16 or 32 pages, in which the book is sewn. The signature appears on the first page of each section, and usually consists of capital or small capital letters in succession throughout the alphabet, omitting J, V, and W, and continuing if necessary to 2A or Aa, and so on. The preliminary pages, printed and folded separately from the rest of the text, are signatured in lower-case letters beginning with a. Signature B always appears on page 1, and thereafter signatures appear every 16 or 32 pages (C, page 33; D, 65; E, 97; and so on), which makes checking simple.

The signature usually appears at the foot of the page, centred there if the page number is at the head, or, if the page number is at the foot, between the page number and the back margin. It is sometimes combined with a set of initials or of numerals (the catchword) which indicate to the printer and binder to what book the signature belongs (though this appears to be quite unnecessary when running headlines are used). The signature mark and its allied particulars are sometimes set in an unsuitable style if the matter is left to the compositor, as it usually is. Neatness and unity of design are best maintained if signatures are set in the same fount as the page number and aligned with it, and with one of the margins.

The ambiguities of printing terminology are seen at their best here. A section may also be known as a signature or 'sig', so that the section has two names and 'signature' has two meanings. The sections of a book may also be known as the sheets or quires, the latter being a term also used to describe a number of sheets of paper (§ 185).

§95 · CHAPTER OPENINGS AND INITIALS

The first paragraph of a chapter is commonly begun without the indention usual at the beginning of subsequent paragraphs. This is partly a matter of custom, but the custom survives because of the neat appearance of a rectangle of text immediately under the chapter head, instead of the asymmetric shape resulting from an indented first line. There is, of course, no need to indent this first paragraph. The first line of text after subordinate headings can be set to full measure in the same way; this might, however, prove expensive if the author is likely to change the position of his headings in the text.

The beginning of the first paragraph of a chapter is often marked by a large initial letter (§ 97). This is almost entirely a matter of custom; initials are successful only when they are handsome in themselves and impeccably

placed, and they are seen at their best only when there is a real need for them. This need arises, for instance, in prayer books, where new items in the service, such as prayers, responses, and so on, have to be distinguished from their neighbours.

An appearance of purpose is essential to the successful placing of initials; this is achieved by the alignment of the initial with the neighbouring text. The foot of the initial always looks neatest if it is aligned with the foot of the short letters in a line of text, and if the next line immediately below the initial is set to full measure; an ordinary capital letter used as an initial will usually have to have its beard trimmed to make this possible—otherwise there will be an unsightly white space below the initial.

the full size of the body of a capital T.

HIS SHOWS HOW the beard of the same letter can be trimmed to fit more closely into the text.

Mortised initial (Centaur).

The alignment of the head of the initial gives it its name. A drop initial aligns at the head with the head of the capitals or small capitals of the first line of text, and drops to align at the foot with a subsequent line; a 5-line drop initial, for instance, extends from the first to the fifth line. A stick-up or raised initial aligns at the foot with the first line of text, and rises beyond it. Also in use today is the initial which both drops and rises.

Initials appear to be most aptly placed when they are centred optically in the text indention they occupy. An extreme case is an ordinary titling T, when used as a drop initial of three or more lines. If the left-hand edge of the letter's shank is aligned with the left-hand edge of the text, the initial will appear to be too far to the right, because of the space to the left of the vertical main-stroke. The neatest position for the same letter is with the vertical stroke aligned with the edge of the text, and with the left half of the cross-bar projecting into the margin. This, of course, entails extra time and cost in the make-up of the pages.

If the head of a drop initial is to range with the head of the first line of text, the text will need an evenness of height which short and ascending lower-case letters do not possess. This evenness is usually achieved by the use of either capitals or small capitals for the rest of the word which contains the initial, for the rest of the phrase, or even for the rest of the line. This tends unduly to emphasize a part of the text, and is one of the arguments against the use of drop initials. (Another argument, against the use

of initials in general, is that in a conventionally designed book they provide emphasis at an off-centre point.)

The arrangement of text on the right of an initial tends to need the designer's attention. If, for instance, a large capital L is used as a drop initial, and if the text which follows it is set against the right-hand edge of the letter's shank, the word of which L is a part will be split in two. The initial must instead be mortised, so that the rest of the word can be set close up against the vertical stroke. As for the succeeding lines, they tend to look neater when set as close as possible against the initial letter itself,

s THIS EXAMPLE SHOWS,
an initial may fit better
if mortised in such a way
that the adjacent text fits closely.

even if it has to be mortised to receive them. There is no need for more than a few points of space between the initial letter and the adjacent lines of text.

BOOKS

BRITISH STANDARD 1629 - Bibliographical references - British Standards Institution, 1950 - pamphlet.

BURBIDGE, P. G. - Notes and references (Cambridge authors' and printers' guides, number 4) - Cambridge University Press, 1952 - pamphlet.

See also, after chapter 1, JENNETT and SIMON; after chapter 2, CHICAGO, COLLINS, DE VINNE, HART, and SKILLIN; and after chapter 9, MORISON and STEER.

Display and ornament

Display composition in books is usually understood to mean the composition of single lines of type, or of groups of lines, which are neither part of the text of the book, nor part of such accessories of the text as headlines, sub-headings, notes, extracts, and folios, nor part of the text of subsidiaries such as the preface, introduction, appendixes, glossary, and so on. It comprises the setting of the half-title, title, imprints, bibliographical details, dedication, lists of contents, illustrations, and abbreviations, headings of preliminary pages, and part and chapter-headings.

Text composition is designed for sustained reading, display composition for reading at a glance. The selection and arrangement of type for display are governed less strictly by convention than is text design because of this difference in function, and for mechanical reasons the technique of display composition is often different from that of text design. The very term 'display' suggests an element of show, of decoration, and even of advertisement; and the best display work is that which fulfils the primary object of all typography, communication, and in addition is touched (but not too heavily) with creative originality. Ornament, which as a rule is not used on the text pages—where it might interfere with their function, however slightly—has its place in display.

The importance of the design of display composition is sometimes overrated. Some laymen suppose that the function of a book designer is to arrange the display and the jacket, and leave the rest to the printer, and publishers have been known to call in a typographer to design preliminary pages only. For one minute the reader spends on the display of the average book, he spends an hour or more on the text pages. By far the most valuable part of the typographer's task, therefore, is to produce as legible and attractive a text-page as possible—and not merely one page but hundreds, and not merely in one book but in thousands of copies of each book. It is by text pages that book designers must be judged—and not by their intentions for the text pages, but by the text pages as they appear in the finished book.

§96 · DISPLAY COMPOSITION

The most economical method of display composition is to use machine setting and the text fount, and for many books this style is perfectly adequate. Even the title-page can be set on the keyboard, with the text; the use of unnecessarily large founts on title-pages is a common fault.

Within limits, large display founts can be set on the machine. The standard Monotype composition caster can produce composed type in sizes up to 14-point, but the use of the large type composition attachment extends the range to 24-point. The single-keyboard Linotype can produce founts up to 24-point, and the side-magazine models can set up to 36-point upper and lower-case (and up to 48-point capitals on 36-point body).

However, large display founts are not usually set on the keyboard, because of the time needed to set up the machinery for composing only a few lines. Mechanical word and letter-spacing is good enough for text composition, but when larger founts are used the hand-compositor can do better; he can examine, and if necessary adjust, his spacing while the line is still in the composing-stick so that the spacing will be optically even.

Not only type but matrices can be composed by hand. The All-Purpose Linotype (A-P-L) is, in effect, a Linotype casting mechanism only, without magazines or keyboards. Ordinary Linotype matrices, from 5 to 36-point upper and lower-case, can be used, or special A-P-L matrices from 18 to 144-point. The matrices are assembled by hand in much the same way as a line of type, and when they have been fixed into the caster a slug is cast from them. The caster can produce strips of letters so spaced that they can be sawn apart and used for hand composition. The Ludlow caster works in much the same way.

The spaces used in composing type by hand have already been described (§ 18). These spaces are available for display composition, and there are also brass and lead spaces which permit of any thickness of spacing to the nearest ½-point. Word and letter-spacing for hand-composition may therefore be described in terms of standard spaces or of points, and unit values should not be used.

Various tools may be used on individual letters of large founts to make them serve the typographer's task; the most common adjustment is to trim the beard of a capital in order to fit it into a space which otherwise would be vertically inadequate, and letters may also be mortised to fit more closely together than would be possible otherwise.

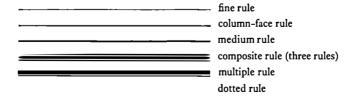
§97 · DISPLAY MATERIAL

Soon after the mechanical caster in its various forms arrived to offer the printing trade an unprecedented variety of ornamental material, typography in general, and book design in particular, entered upon one of its periodic cults of plainness. At the time of writing, most books are produced without the smallest flourish of decoration appearing even in the preliminaries; nor is that mastery of presswork, materials and proportion, the chief glory of such books as those of Baskerville, often present to take the place of ornament. Yet some of the decorative material now available is well suited to books of this day and age, and a more frequent use of it might well encourage artists to work towards a mid-20th-century style in decoration for printing.

In the choice of text founts the designer is usually limited by what is available at a particular printing office; the printer cannot often buy a complete set of text matrices and all their auxiliary equipment for use in one or two books only. Display material, on the other hand, is quite otherwise, for it consists of single units or small groups of units, the cost of which will form a very small proportion of the composition costs of any book. A few shillings, or a pound or two, will buy from any foundry in Europe enough cast display type for the display lines of any book; and the matrices of many Monotype display founts can be hired from the corporation. Display material can even be made specially for a book, engraved manually or photo-mechanically.

Decorative material is of several kinds. Rules are strips of brass or typemetal which print a straight line, and which may be cast or cut to any length without affecting the design. Plain rules, which print a single, uninterrupted straight line, may be of almost any thickness. A fine rule is of hair-line thickness. Next in thickness is a column-face rule, normally used to separate columns of text when two or more stand side by side. A medium rule is ½-point across the printing surface, and thereafter rules are quite closely graduated in size. The body of a rule is usually not less than 1½-point, so that rules set side by side have some space between them.

A multiple rule is one in which two or more lines of printing surface are mounted on the same body. One thick and one thin line is a popular form of multiple rule. A rule which prints a dotted line is a dotted rule, and there are many kinds of rule in which the line is interrupted in some regular manner like this. An ornamental rule is one in which the line



¹ This definition may be considered to be a useful one, but is not generally recognized.

consists of a repeated decoration; there is very little difference, if any, between an ornamental rule and a strip border.

To use another reasonable but not widely accepted definition, a dash (other than the dash used in punctuation) is a form of rule the length of which is fixed by its design. The Bodoni dash (so called because of its frequent use by that printer) is also known as a swelled or tapered rule. A cut-off dash, or French rule, is a short dash with a diamond-shaped centre. Ornamental dashes of many kinds are available, some of them unobtrusive and graceful; some of the intricate Victorian designs are still used, and modern artists have drawn or engraved dashes to the order of individual presses or publishers.

A border is a repeated decorative design. Monotype continuous borders are those which consist of a single casting, whatever the length. Linotype ornamental borders from matrix slides are strips of border cast on a slug up to 30 picas long. Fleurons (or printers' flowers) are decorative units which can be built up into variously shaped patches of decoration, or into decorative backgrounds, or into borders. They can also be used to emphasize or set off a part of the typography (figure 20, § 90, and figure 27, § 99). They are most commonly used to produce borders, and are sometimes collectively termed borders. The originals of some of these designs are centuries old; others, which are all too rarely used, have a genuinely modern appearance. Border units tend to be unimpressive when seen singly in a specimen book; but the most astonishing patterns can result from animaginative use of them. The swirling border in figure 21 on page 147 is constructed from these six units:



This kind of tour de force can hardly be achieved by an effort of the imagination alone; the typographer must have actual fleurons to hand, or at least proofs, which can be arranged and rearranged until a satisfactory pattern is formed.

Display type is a term usually applied to founts of 14-point and above. There is no rigid definition, since Monotype composition matrices, which are different from display matrices, are available in sizes up to 24-point, and display matrices start at 14-point. The meaning of the term is founts not intended for text composition, and it therefore comprises both large founts of text series and founts of ornamented letters which may be smaller than 12-point.

The earliest printers cut their own punches and cast their own type, but early in the 16th century typefounding became a separate trade. Foundries

flourished and multiplied, until towards the end of the 19th century the invention of mechanical punch-cutting made matrices available to all, and the composing and casting machine provided printers with their own foundries. During the 20th century one historic foundry after another has closed down; those which survive are few in number, but rich in the possession of ancient punches and matrices. Not all this old equipment is still in use, but many interesting and handsome types, fresh cast from the matrices of previous centuries, can still be used for display in books. At the Caslon letter-foundry in Sheffield, for instance, Messrs. Stephenson, Blake, the leading British typefounders, trace their descent back to Caxton, and are still using the original punches of William Caslon I, as well as material from many other famous British foundries. In Holland the foundry of Messrs. Enschedé en Zonen of Haarlem has material originating from nearly every period of Dutch printing history, including the 15th century. The University Press, Cambridge owns Baskerville's punches, and the Imprimerie Nationale in Paris has those of Jannon. Several other active foundries have been mentioned in chapter 8, and there are others where old punches and matrices survive, although no longer available for

FRY'S ORNAMENTED ROSART GRESHAM

Union Pearl

FOUR OLD DISPLAY TYPES. Fry's Ornamented, a design of the late 18th century (Stephenson, Blake); Rosart, a design of the first half of the 18th century by J. F. Rosart (Enschedé); Gresham, late 18th-century (Stevens Shanks); and Union Pearl, a late 17th-century design which is the oldest English decorated type (Stephenson, Blake). The first three were originally designed in capitals only; Gresham has a more recently designed lower-case.

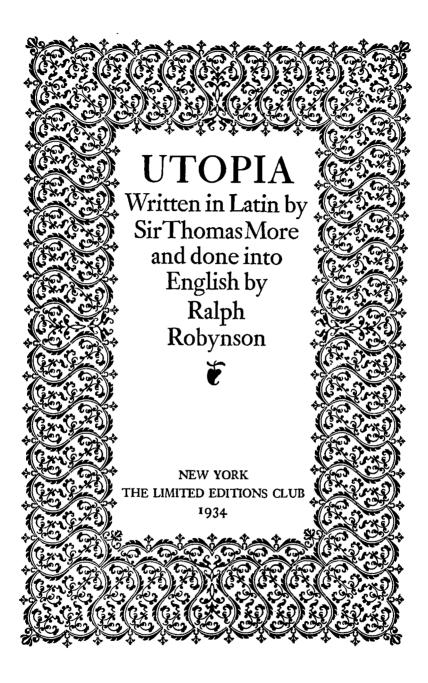


FIGURE 21. A tour de force of typographic decoration by Bruce Rogers. 'By composing the border at an angle of forty-five degrees and making an electrotype which was restored to its usual rectangular position in the chase for printing, the result was a border that cannot be produced in any other way.' (The designer, in Paragraphs on printing.) Reduced from 10½ in. deep: originally printed in two colours.

general use. The oldest typographic material in Britain is still in use at the University Press, Oxford—strikes from Granjon's punches, and Greek punches from Baskerville's foundry, are part of the collection.

The situation of the various foundries varies from time to time; European founders, for instance, sometimes open, close, or change their agencies in Britain. Foundries abroad usually supply types on their own bodies but in British type-height.

Some of the old founts were cut with such precision that they are hardly to be distinguished from their modern revivals, cut for machine casting. Others have the charm and slight irregularity of the hand-made; a few, such as the larger Fell founts, cut in Holland during the 17th century and still used by the University Press, Oxford, have a bold irregularity which makes most founts now in use look prim. Caslon's own roman is still better than any of its imitations. Old ornamented founts still attract designers; some of the particularly handsome ornamented letters now in use were cut during the 17th and 18th centuries.

Foundries are still producing new types and ornaments, but not all are of much interest to the book-designer. It would be surprising if they were, since most founders rely on sales to jobbing and general printers, who are many, rather than to book printers, who are few, and the style of most jobbing display is quite different from that of bookwork. Debased forms of letter are still considered suitable—sometimes even essential—for letter-heads, wedding stationery, and advertisement composition, and not all foundries are unwilling to provide types to meet this demand. When the standard of typography in general printing improves, book designers may expect to have the use of greater numbers of attractive display founts; some are available already, particularly from Dutch and German foundries.

In addition to large founts of text series, and founts of ornamental letters, display type includes the titling fount. This is a fount which contains no lower-case letters, and since there are no descenders the capital letters, numerals, and so on which comprise the fount can occupy nearly the whole of the type-body from top to bottom. Titling letters may therefore be closely surrounded by ornamental material or by text without the

I Continental and American foundries with British agents at the time of writing include American Typefounders Incorporated of New Jersey, Haas'sche Schriftgiesserei AG of Switzerland and Typefoundry Amsterdam of Amsterdam (Graphic Arts Ltd., 3 Fetter Lane, London EC4); Bauersche Giesserei of Frankfurt and Schriftgiesserei Gebrüder Klingspor of Offenbacham-Main (Soldans Ltd., 5 Theobalds Row, London wc1); Schriftgiesserei H. Berthold AG, Mehringdamm 43, Berlin sw 61 (C. F. Moore and Sons Ltd., 11 Sekforde Street, London EC1); and Fonderie Deberny et Peignot, 18 rue Ferrus, Paris XIV, some of whose types can be obtained from Stephenson, Blake—the rest can be supplied direct. Continental foundries accustomed to supplying type of English height-to-paper include Lettergieterij Joh. Enschedé en Zonen, Haarlem, Holland; Fonderia Tipografica Società Nebiolo, Via Bologna 47, Turin; and Schriftgiesserei D. Stempel AG, Hedderichstrasse 106-14, Frankfurt-am-Main.

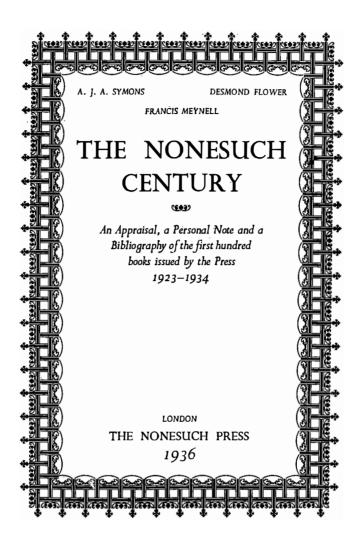


FIGURE 22. The border is composed of three fleurons, a multiple rule and a parenthesis. Reduced from 12 in. deep.



ILIAD V

But Pallas now Tydides' soul inspires, Fills with her force, and warms with all her fires, Above the Greeks his deathless fame to raise, And crown her hero with distinguish'd praise. High on his helm celestial lightnings play, His beamy shield emits a living ray; Th' unweary'd blaze incessant streams supplies, Like the red star that fires th' autumnal skies. When fresh he rears his radiant orb to sight, And bath'd in ocean, shoots a keener light. Such glories Pallas on the chief bestow'd, Such, from his arms, the fierce effulgence flow'd: Onward she drives him, furious to engage, Where the fight burns, and where the thickest rage. The sons of Darcs first the combate sought, A wealthy priest, but rich without a fault; In Vulcan's fane the father's days were led, The sons to toils of glorious battel bred; These singled from their troops the fight maintain, These from their steeds, Tydides on the plain. Fierce for renown the brother chiefs draw near, And first bold Phegeus cast his sounding spear, Which o'er the warrior's shoulder took its course. And spent in empty air its erring force. Not so, Tydides, flew thy lance in vain, But pierc'd his breast, and stretch'd him on the plaip. Seiz'd with unusual fear Idccus fled. Left the rich chariot, and his brother dead; And had not Vulcan lent celestial aid, He too had sunk to death's eternal shade;

148

FIGURE 23. The illustrations are composed from cast ornaments designed by Rudolf Koch. In order to align the Greek with the English, in spite of disparities in the number of lines, the Greek throughout the book was set on various bodies, including old bodies which provided intermediates between the usual fractions of a point. Designed by



ΙΛΙΑΔΟΣ Ε

Ένθ΄ αὖ Τυδείδη Διομήδει Παλλάς 'Αθήνη όῶκε μένος και θάρσος, τν' ἔκδηλος μετὰ πᾶσιν 'Αργείοισι γένοιτο ίδὲ κλέος ἔσθλὸν ἄροιτο' όαιξ οἱ ἔκ κόρυθός τε καὶ ἀσπίδος ἀκὰματον πῦρ, ἀστέρ' ὁπωρινῷ ἔναλίγκιον, δς τε μάλιστα λαμπρὸν παμφαίνησι λελουμένος 'Ώκεανοιο' τοιόν οἱ πῦρ όαιεν ἀπὸ κρατός τε καὶ Φμων, ὧρσε δξ μιν κατὰ μέσσον, δθι πλείστοι κλονέοντο.

*Ην δέ τις έν Τρώεσσι Δάρης, άφνειὸς άμύμων, ίρευς Ήφαίστοιο δύω δέ οι υίέες ήστην, Φηγεύς Ίδατός τε, μάχης εὖ εἰδότε πάσης. τώ οι αποκρινθέντε έναντίω ώρμηθήτην. τὼ μὲν ἀφ' ἵππσιιν, ὁ δ' ἀπὸ χθονὸς ῶρνυτο πεζός. οί δ' ότε δή σχεδον ήσαν έπ' άλλήλοισιν ίόντες, Φηγεύς ρά πρότερος προίει δολιχόσκιον Έγχος: Τυδείδεω δ' ύπερ ώμον άριστερον ήλυθ' άκωκή ἔγχεος, οὐδ΄ ἔβαλ΄ αὐτόν ὁ δ΄ ὕστεροςῶρνυτο χαλκῷ Τυδείδης του δ' ούχ άλιον βέλος ξκφυγε χειρός, άλλ' ξραλε στηθος μεταμάζιον, ώσε δ' άφ' ίππων. 'Ιδαίος δ' άπόρουσε λιπών περικαλλέα δίφρον, ούδ' ξτλη περιβήναι άδελφειοῦ κταμένοιο· ούδε γαρ ούδε κεν αύτος ύπεκφυγε κήρα μέλαιναν, άλλ' "Ηφαιστος έρυτο, σάωσε δὲ νυκτὶ καλύψας, ώς δή οἱ μὴ πάγχυ γέρων άκαχήμενος εἶη.

149

unsightly gap underneath which would be unavoidable with an untrimmed capital of a display fount. Titling also provides an intermediate size of capitals, between the sizes of capitals of the ordinary display founts; the

Klang

Lydian

Elizabeth

Ornata

Albertus

FIVE 20TH-CENTURY DISPLAY TYPES. Will Carter's Klang (Monotype); Warren Chappell's Lydian (American Typefounders); Elizabeth Friedlander's Elizabeth (Bauer); O. H. W. Hadank's Ornata (Klingspor); and Berthold Wolpe's Albertus (Monotype).

capitals of 30-point Perpetua Titling, for instance, are larger than those of 36-point Perpetua roman, but not so large as those of 42-point Perpetua roman. The titling design may also be a special design, different from the other capitals in the family; light titling is a particularly useful style, since the capitals of large display founts are sometimes uncomfortably heavy. Ordinary capitals may be used as titling if the beards are trimmed away.

ERE A 48-POINT TITLING initial, some 45 points high in face, fits closely above the first line of text beneath it, although the beard has not been trimmed at all.

An Albertus Titling initial with Plantin Light.

Initials (in the sense of letters specially designed for use as initials) are ornamented or ornamental capitals which, like titling founts, occupy nearly the whole type body, but which are designed for use singly as decorative units rather than in combination to produce words. Titling founts, however, are also useful as initials.

Finally, the most neglected source of decoration for books is the skill and invention of the graphic artist. Decoration can for instance be engraved on wood and printed with the text. Display lines can be written

WEISS INITIALS I WEISS INITIALS II BEMBO TITLING PERPETUA LIGHT

FOUR TITLING TYPES. E. R. Weiss's Weiss Initials, Series 1 and 11 (Bauer); Bembo Titling (Monotype); and Eric Gill's Perpetua Light Titling (Monotype).

by a calligrapher; borders, initials, rules, and fleurons drawn by any artist with a talent for decoration; and the whole converted into line-blocks (chapter 13). Some book-designers themselves develop skill of this kind.

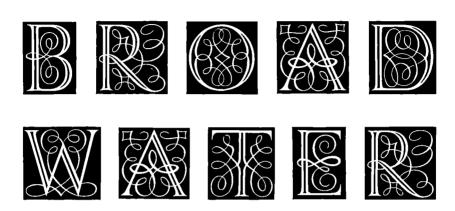
When one item of decoration, for which no matrix is already available, is to be used over and over again (as, for instance, the penguin printed on the covers of Penguin books), a matrix may be specially struck, and this may prove more economical than duplication by other means (figure 23).

§98 · TYPE FOR DISPLAY

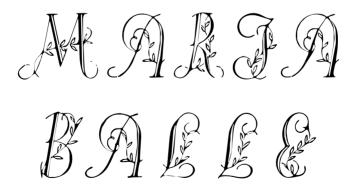
Usually in Britain display types are chosen from founts of the series used for the text, and the text fount itself is sometimes used. Close relations do not, however, always look alike, and in some series—of which Caslon and Walbaum are examples—there may be a striking difference between the text and the display founts.

Display founts of a series other than that used for the text may also be chosen. The traditional school of typographers, when mixing two series, prefers to use series which are related to each other in appearance, however distantly. The relation is usually one of period; if the text is set in old face, an old face, or a type of that style, is often selected for display. Twentieth-century type-faces (§§ 68-76) are classified by periods from which they





FLORIATED



SOME INITIALS. Henk Krijger's Raffia (Amsterdam); initials drawn for the Broadwater Press by A. E. Barlow; Eric Gill's Floriated Capitals (Monotype); and Maria Ballé's Ballé (Bauer).

seem to derive, and are mated with a fount originating in that period. The choice of display founts, however, is partly a matter of taste, and widely dissimilar designs are sometimes used together. The Romulus series of Enschedé en Zonen, which includes several kinds of bold and sans serif as well as a script, may point the way to combinations of designs which are neither completely dissimilar nor obviously related.

Ornamental letters are less widely used in bookwork than in jobbing printing, partly because there are few successful ornamental founts which include lower-case, and partly because such letters are seen at their best in large display founts. The charm of fanciful letter-design begins to pall when it is used for a whole series of chapter-headings. Such founts sometimes appear only on the title-page. An ornamental series which includes lower-case in suitable sizes, if it is not too exotic in design, is sometimes used to differentiate headings from text.

Excessive ornament may interfere with the legibility of the letters. For this reason designers tend to prefer those ornamental series which in their fundamental form are close to the conventional proportions of the

Colomina

LUTETIA OPEN

OPEN CAPITALS

Chisel

FOUR OPEN DISPLAY TYPES. Colonna (Monotype); Jan van Krimpen's Lutetia Open and Open Capitals (both Enschedé); and Chisel, adapted from a late 19th-century Latin Bold Condensed (Stephenson, Blake). The two van Krimpen types have capitals only.

¹ A script type is designed in imitation of handwriting. Romulus script is based on a form of chancery italic.

roman or italic printed letter. On the other hand, type-faces derived from a past fashion in typography (such as Civilité type, an ornamental script used during the 16th century) or from some familiar kind of writing such as copper-plate, may be used because they can be recognized at once. The only kind of ornamental letter which has no place in books is that which is ambiguous or difficult to recognize at a glance.

Hammer Uncial

l i b R a

THREE NON-ROMAN DISPLAY FACES. Victor Hammer's Hammer Uncial (Klingspor); S. H. De Roos's Libra (Amsterdam); and F. H. E. Schneidler's Legend (Bauer).

The least common, and yet potentially the most interesting, kind of display letter is that which is written specially for the book by a calligrapher (figures 24 and 25). The practice of formal handwriting should be part of a typographer's education, and the book designer may find skill enough to decorate some of his books with his own letters. Where a professional scribe has to be called in, and the book is to be printed by a relief process, the artist's fee and the photo-engraver's charges may be prohibitive. A designer who is his own scribe may be able to use calligraphy, particularly in a book to be printed by a photographic process (chapter 15), since the whole book, display and text together, is to be photographed in any case. Here again legibility has to be remembered. The most legible calligraphy is that which is quite closely related in its general form to type letters familiar to the reader, and a practised scribe may be able to draw pleasant variations on this theme.

The fount used for display should not be so big that it appears uncomfortably large when the book is held at a distance suitable for reading the text. Letters which are too big may be just as unpleasant to read as those which are too small, and may look even less attractive. The emphasis of particularly big display lines may also overwhelm any text which



WITH HINTS
FOR ITS WIDER USE
TO DAY

By Paul Standard

THE SOCIETY OF TYPOGRAPHIC ARTS
CHICAGO · 1947

FIGURE 24. A handwritten title-page by Raymond Da Boll: in the original, the title is printed in a second colour. Reduced from 9½ in. deep.

appears in the same opening, and may tend to distract the reader from the smaller type. Even the capitals of the text fount may seem rather too big, particularly if they are tall in relation to the short letters, and those of a smaller fount may be preferred. If the series is one whose capitals are no heavier than their lower-case, the body-line of the capitals of the smaller fount may, of course, be thinner than that of the text lower-case, which will give the heading an appearance of contrasting lightness. If headings are set in letters which appear to be smaller than those of the text, the display will look subsidiary to the text, an effect which may be useful. Parts of the display are in fact subsidiary, and they should be set in a fount no larger than that used for the text; they include the printer's imprint, the publisher's address (if amplification of the title-page imprint is needed), and the bibliographical details of the book.

The right proportion in size between display lines and the text fount and size of page is a matter of taste. As a very rough guide, twice the size of the text fount will usually be big enough for any display, and half as big again as the text will do for display which appears on the same page as part of the text. On the other hand, when a small type is used in double column in a large format, the size of the display lines should be related to the page size rather than to the size of the text fount.

Relative emphasis can be adjusted by the use of different series and of different founts. If a bold type is used for the headings, the bold letters may look smaller than a medium-weight type of the same size, unless the counters of the bold letters are very nearly as large as those of the medium weight. Emphasis depends partly on the thickness of the body-line of the letters, partly on their classification (capitals, italic, and so on), and partly on their apparent size. Of two alphabets which appear to be the same size, that with the thicker body-line appears to be the more emphatic. Capitals which are equal in x-height to the lower-case of a larger fount are more or less equal in apparent size and usually seem to be slightly more emphatic; to most people, italic is rather more emphatic than roman.

When one line is set in the capitals of a display fount, and the next in upper and lower-case of the same fount, the lower-case is curiously apt to look slightly too big, particularly if the capitals are not large in proportion; it is often well to use the lower-case of a fount one size smaller. Where emphasis is to be graded, the difference in size between displayed lines or groups of lines should be obvious; if, for example, the main title-line is in upper and lower-case, and the sub-title is in capitals of a smaller fount, the x-height of the capitals should be clearly smaller than that of the lower-case letters. The diminishing thickness of body-line in smaller founts must be remembered. If the capitals of two different founts are used in one line, the disparity of body-line may become obvious.

Calligraphy is a life-saver, a sparker, a profit-booster, a reducer of taxes and of sales resistance

o, THIS WON'T DO; no reader would believe it—not even if it were "calligraphed" by Arrighi himself. Which proves that not even the fairest hand can turn sheer nonsense into a sober truth. Yet these opening claims, outrageously overstated, do have a trace of truth, if we dismiss their sillier aspects.

For calligraphy is one of those awkward topics for the printer, since he so largely neglects it even though it does contain "the seed of our common print." The quoted phrase is Edward Johnston's \(\)—and he ought to know, having himself revived the art of calligraphy in our time and written what is still (after a solid forty years) the bible of letter-forms.\(\) The neglect on the part of the printer is understandable, but it's time that this neglect were redeemed, as indeed it has already been redeemed among book publishers. But wider uses await it when our peace-time revival gets into stride.

Perhaps we should urge first revival, then experiment. For when printing was young, as Cobden-Sanderson said,²

1. Still in print; full title: Writing & Illuminating & Lettering (New York: Isaac Pitman). This book belongs with Daniel B. Updike's Printing Types (Cambridge: Harvard University Press) in every working printer's library.

2. Ecce Mundus—The Book Beautiful; London, 1902.

Tis death at 72 in Ditchling, Sussex, on Nov, 25, 1944, brought tributes to his memory in the LONDON TIMES for the five days following. More than reviver; "Johnston was the great exemplar of modern calligraphy, the link between all suribes living and departed.

5

Massed capitals are less easy to read than lower-case, and capitals therefore tend to be reserved for picking out and emphasizing an occasional phrase, or a group of short phrases; long titles and sentences will be much more legible in upper and lower-case. Capitals or small capitals are sometimes used rather ineptly for a list of contents, in which each chapter title is composed of several words; the appearance of a list set in this style may be quite discouraging to the reader. Lower-case also has the advantage of its narrowness; it can fit more words into one line without running into a second. Lower-case italic, of course, is laterally the most economical alphabet of all.

§ 99 · PLACING

The best arrangement of display lines is that in which the sense of each phrase, and its importance in relation to that of other displayed phrases on the same page and elsewhere in the book, leap to the eye. Different alphabets within one fount, different founts, different series, spacing and grouping, and even ornament can all be used to distribute a right proportion of emphasis between phrases, and to differentiate one displayed phrase from another.

When designing text composition, the typographer cannot choose the words with which to end one line and begin the next, but display composition allows him to specify which words are to appear together in one line. In order to clarify the meaning of a group of display lines, the designer can decide in detail which words are to be set in which line. When a displayed sentence or phrase cannot be fitted into a single line, the designer (perhaps with editorial advice) settles on what he considers to be a natural caesura or pause among the words at which to break the line (or at which to avoid breaking it). Changes in the position of the break tend to cause a slight transfer of emphasis from one part of the displayed phrase to another, and may suggest a different presentation which will transfer emphasis even more obviously. That some practices survive which were considered obsolete when De Vinne was writing in the 1900's can be seen from figure 26.

It is true that in speech such particles as 'the' and 'of' are spoken without the emphasis accorded to nouns and verbs and other major parts of speech. But this is by no means the same thing as setting particles in a smaller size as well as placing them centrally where they may not be obvious enough for their very real value. If neighbouring lines consist of one or two short words only (not more, in fact, than can be assimilated by a single glance at the centre of the line) the reader's eye will pass down the centre of the display lines, and will take in the centred particles on its way. THE

GRAMMAR ENGLISH GRAMMARS

тне GRAMMAR OF ENGLISH GRAMMARS

FIFTY YEARS AMONG AUTHORS. AMONG AUTHORS. BOOKS BOOKS AND PUBLISHERS

FIFTY YEARS AND PUBLISHERS

THE ART OF ILLUSTRATION The Art of Illustration

THE ART OF **ILLUSTRATION**

SENTIMENTAL JOURNEY THROUGH FRANCE AND ITALY

SENTIMENTAL JOURNEY THROUGH FRANCE AND ITALY

CRITICAL AND MISCELLANEOUS **ESSAYS**

CRITICAL AND MISCELLANEOUS **ESSAYS**

ONE HUNDRED BOOKS FAMOUS IN ENGLISH LITERATURE WITH Racsimiles of the Citle-pages

ONE HUNDRED BOOKS FAMOUS IN ENGLISH LITERATURE WITH FACSIMILES OF THE TITLE-PAGES

Old method.

Modern method.

If, on the other hand, the particles are centred on wide display lines, the eye will have to move in uneven zigzags to pick them up, perhaps in addition to adjusting itself to different sizes of letter. Although not well placed for being read, the centred particles also borrow undue emphasis from their isolation. No reader is likely to be distressed by an awkward setting of this kind; but the best possible style is that which makes the fewest demands on the reader. If legibility were the only criterion of good display setting, a complicated title-page might be easiest to read if all the lines were aligned at the left, as text is. Not many British book designers, however, have yet launched out into the off-centre style with all its difficulties, lacking conviction of its value if not the impulse and skill to make the best use of it. An example of the more conservative kind of off-centre display is shown in figure 27.

Only the centred style is generally used in British books today, though several other kinds of style are widely used in America, not only by experimental typographers but by university presses and other houses of standing. Display lines have been centred for hundreds of years, and readers and printers are accustomed to no other style; centred lines also have an appearance of balance and repose, and provide a pleasantly symmetrical page.

The arrangement of display lines, however, does not need to be governed so rigidly by convention as the design of text composition. No reader is likely to have difficulty in reading display lines because they are not centred within the text measure; nor will off-centre display necessarily deter him from buying or reading a book. Display must be designed in a legible and logical manner, and should be neat and pleasant in appearance; if all this can be achieved without centring the display lines, there is no compulsion to use the centred style. Other styles are more difficult to handle, but when applied to suitable books may offer the possibility of better results. Unconventional treatment is best suited to that kind of book which in content (because of a particularly modern subject or style) or in appearance (because of modern material, modern illustration styles or techniques, or irregularity in the form into which the text falls) is obviously in every way a product of the 20th century rather than of the previous centuries of printing history. When an off-centre style is used, it should enhance rather than diminish the page's legibility and clarity of arrangement, and should provide an appearance of pattern and purpose no less than the centred style. Display lines should never seem to be scattered at random over the page; if they are aligned in groups with each other and with illustrations and ornament, the haphazard look can be avoided.

CHAPTER THIRTEEN

OVING silently he crossed the courtyard. He had no means of knowing the topography of the place yet he went at once to the single spot where he could observe without being observed. Thinking, I must not be there when the bobby returns, he moved straightaway, not with any undue effort at silence or concealment but rather as if of all possible destinations his feet moved of their own volition without thinking or consideration, to that one place where he could watch, from which, when the time came, he could act. Although he did not yet even know in what manner he would confront, kill -since he could not have known Arnold's design or movement, or even for certain if he was still in the building-he did not bother to consider alternatives. With a certain knowledge that was entirely animal and in which thinking, circumstance, bore no part he moved to the place that of all places was the one suited to his purpose. Possibly it was an instinctive cunning; likely such an absence of design becomes a design in itself, succeeds to the intransient and impoverished schemes of logic, circumstance, succeeds even to thought itself when thought has become frayed, volitionless. His movements too had become invested with that animal quietude which could not be learned in a civilized lifetime yet which lies beneath a veil of thought. So that he moved without thinking, with no particular reason or purpose for being quiet, since there was none who watched or cared, yet moving with that completeness of silence that surprised even himself, so that he found himself momentarily



165

FIGURE 27. This page in the off-centre style by Stefan Salter achieves a restful and finished effect by careful letter-spacing, by the vertical and horizontal alignments of the initial with lines above and beside it, by generous leading combined with reasonably close setting, and by the use of a fleuron to emphasize and complete the diagonal style of display. Reduced from 8 in. deep: set in Linotype Fairfield (not available in Britain).

§100 · SPACING

Letter-spacing and word-spacing are no less important in display than in text composition. That words in capitals or small capitals, whether roman or italic, are improved by letter-spacing has already been pointed out. For display founts as for text, a medium thickness for letter-spaces is about one-ninth of the set (which in display founts is equal to the body), so that 18-point capitals may well be 2-point letter-spaced. Display letterspacing is usually done by hand, and should be optically even; that is not the same as being mechanically even—a thicker space is for instance needed between two adjacent vertical strokes, as in ND, than between two divergent oblique strokes or curves, as in RA or TC. Word-spacing which is too wide or too narrow will spoil any display line, and a meticulous typographer may choose to specify the word-spaces to be used. In a line of capitals or small capitals which are letter-spaced about one-ninth of the body, en quads will probably be best for word-spacing. Wider letterspacing requires wider word-spacing, and narrower letter-spacing makes possible narrower word-spacing. Large sizes of upper and lower-case need a very little more word-spacing in proportion to their size than do text founts, and middle spaces (one quarter of the body) are usually suitable. As far as possible, word and letter-spacing should appear to be uniform throughout all the display composition (figures 28 and 29); this is particularly important for letter-spacing, which is sometimes widened in order to emphasize or differentiate a word or phrase. The reader is more likely to notice that something seems to have gone wrong than to understand the purpose of this uneven spacing. Emphasis and differentiation are more surely achieved by the use of different alphabets and founts.

Letter-spacing should be wide only when the display consists of very few phrases. A title-page on which appear a brief title, an author's name, and a simple publisher's imprint can certainly be spaced quite widely; but if the same page includes a sub-title, a volume number, the names of two or three authors and editors and of an illustrator, their various distinctions, and an elaborate imprint, all set in widely letter-spaced capitals, the page may take on an appearance of disintegration as well as being rather confusing to read.

The amount of white space above and below display lines needs careful adjustment. Lines which are crowded together are less attractive to the reader than those which are adequately spaced out; even when display lines are in upper and lower-case, for instance, they will appear at their best if leaded not less than half their body. Capitals often suffer from

FIGURE 28 (opposite). A title-page designed by Jan Van Krimpen, who has a very sure eye for letter-spacing (as indeed for all spacing). Set in Romulus: reprinted from an electro.

JOHN DONNE POEMS

SELECTED FROM HIS

SONGS AND SONETS

ELEGIES

EPITHALAMIONS

VERSE LETTERS

DIVINE POEMS



AMSTERDAM A.A.BALKEMA 1946 overcrowding; the space between lines should rarely be less than the x-height. White space round a display line, separating it from adjacent lines, not only appears to separate its meaning from that of the others, but seems to increase its size and emphasis.

§ 101 · SURROUNDING SPACE

The human eye is not an invariably faithful witness; one of its inaccuracies is in the identification of the centre of a page, or of each of two facing pages. To give two rectangles of text an appearance of being comfortably placed on their respective pages, they are placed nearer the inner and upper edges of the leaf; they may not seem to be centred, but they do not look as though they were 'falling out of the page'. In the same way, of three lines of capitals one above the other, the middle line may appear to be in the middle only if it is very slightly higher than the vertical centre; the same is true if it is a rule or dash that is in the middle, or if there is a group of display lines between two other groups.

Display is as a rule arranged within that area of the page which is bounded by margins similar to those of the text pages. This is partly because uniformity of margins throughout the book tends to simplify the printer's work, and partly because the margins which the designer considers suitable for the text are usually considered suitable for display. The title-page, however, and other preliminary recto pages which face a blank verso are usually imposed slightly to the right of the normal page imposition, which is planned for two facing pages of text. Where off-centre headings are used within the text, they may gain emphasis if part of the heading runs into the margin, but there are equally emphatic and more economical ways of arranging heads. In any case, care must be taken not to run anything too close to an edge which will be cut away if the book is re-bound.

The relationship between the setting and the space which surrounds it often needs careful consideration. One common fault is to place on a vertically oblong page a display setting which makes a horizontal oblong, such as a list of contents with a few long titles; a better fitting of type area to page proportions is shown in figure 30. Title-pages too are often set in an uncomfortably wide shape.

§102 · ORNAMENT

Typographic ornament may be used for several purposes. Display is seen at its best when it has been treated as elements of a pattern, and ornament may improve the shape of the pattern, or pull it together. A title-page, for

THE TRANSFORMATIONS OF LUCIUS

OTHERWISE KNOWN AS

THE GOLDEN ASS

BY LUCIUS APULEIUS

TRANSLATED

BY ROBERT GRAVES

*

PENGUIN BOOKS

MELBOURNE · LONDON · BALTIMORE

FIGURE 29. A carefully spaced title-page by Jan Tschichold: set in Lutetia and reprinted from an electro.

instance, which cannot be made to take on an attractive shape unless violence is done to its meaning, may be squared up by a border; a fleuron or a dash, placed between two groups of display lines, may link but not mingle them. Ornament may also be used to add emphasis to part of the display, or to differentiate one group from another or display from text. And, of course, it is also possible to use ornament as ornament, in order to brighten the appearance of the book.

There are several methods of ornamenting a book as well as several uses for ornament. The most common method is to use ornamental types and other typographic ornament such as fleurons and dashes, since most printers either have a stock of such material, or can buy it without difficulty. Ornamental types are not as a rule used for more than a single phrase or group of lines, since their charm is apt to pall with repetition. Letters which are elaborately decorated need extra spacing if they are to be clear.

When fleurons are used at all these days, they are usually built up into borders and used on the title-page (figures 21-22, § 97). The arrangement of fleurons into a diamond, inverted pyramid, or other pattern to decorate the beginning and end of chapters, is now comparatively rare. Single fleurons, or small groups, are still used sometimes at chapter openings and preliminary pages; and when an off-centre arrangement of display is used, a well-placed fleuron may give an appearance of balance. The less obtrusive kind of fleuron can be used in strips, as an ornamental rule. Although fleurons do not appear as often as they might in the main part of the book, they are sometimes used to decorate the endpapers or the jacket or both.

Decoration in typography is rather out of fashion, and display tends to be bare of ornament. Even when a decorative effect is intended, however, ornament may be less effective than clarity of arrangement, right proportions of size and weight in the various typographic elements, and good letters with careful spacing.

Whatever the style of the display and ornament used in any book, that style should be consistent throughout the book, so that all parts of the book will be in harmony. A centred title-page, for example, is out of place with off-centre chapter-heads, and it is curious that side-heads are so often used with centred cross-heads. Consistency of style in decoration should extend beyond the text to endpapers, to the spine and sides of the cover, and even to the jacket. It is from care of this kind that a book takes on an appearance which is all its own.

THESE POBMS

ARE THE FIRST RENDERING OF SOME PASSAGES

OF THE MEDITATIONS IN SONNET FORM.

BASED ON THE TRANSLATION

BY GBORGE LONG, B.A.

THEY HAVE BEEN SET IN 16 POINT BEMBO ITALICS

AND ARE PUBLISHED BY THE SYLVAN PRESS,

MUSEUM HOUSE, MUSEUM STREET, LONDON.

THE TYPOGRAPHY, PRINTING AND BINDING

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AT THE SIGN OF THE DOLPHIN, AYLESBURY, BNGLAND.

THE FRONTISPIECE, ENDPAPERS AND BINDING

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NUMBERED FROM I-CCL.

THIS COPY IS NO. 6

FIGURE 30. A substantial colophon for a book of little more than 30 pages. Even letter-spacing, and a pleasantly narrow arrangement of type on the page. Set in Bembo small capitals: reduced from 93 in. deep.

BOOKS

- GRAY, NICOLETTE 19th-century ornamented types and title pages Faber and Faber, 1951 illustrations.
- JOHNSON, A. F. Decorative initial letters Cresset Press, 1931 large quarto: mainly illustrations.
- LINOTYPE Linotype decorative material: borders, ornaments, rules, dashes Linotype and Machinery Ltd., 1951 quarto: limp. [A specimen book.]
- WAITE, HAROLD E. Alternative type faces Technical Publishing Co.: 2nd edition, 1951 type specimens, bibliography. (Deals with several kinds of display type not described in the chapter above).
- WARDE, FREDERIC Printers' ornaments applied to the composition of decorative borders, panels and patterns Monotype Corporation, 1928 quarto: type examples, no text.
- See also, after chapter I, JENNETT, ROGERS, and SIMON; after chapter 7, BIGGS (*The use of type*); under chapter 8, BERRY (*Enc yclopaedia*), MONOTYPE, STEPHENSON, BLAKE, and UPDIKE; and after chapter 9, MORISON and STEER.

Preliminary and back pages

The preliminary pages of a book (the preliminaries or prelims) are those which precede the main text. There is no phrase in general use to describe those pages which are not part of the main text but which follow it; for lack of a better phrase, they may be called the back pages.¹

Those pages which precede and follow the main text are used to present a variety of items, several of which are not intended for sustained reading. They allow of a rather more inventive treatment than does the main text, and also of more latitude in the use of large and small type. The order in which they are to appear, although often solved by formula, requires care and forethought.

Oliver Simon, in his *Introduction to typography*, states that books should normally be made up in the following order:

```
half-title
                                          preface
title
                                          introduction
bibliographical details (the biblio,
                                          errata
                                          TEXT
  § 108) and imprint
dedication
                                          appendixes
acknowledgements
                                          author's notes
contents
                                          glossary
list of illustrations
                                          bibliography
                                          index
list of abbreviations
```

All these items, except the bibliographical details and imprint, should begin on a recto.

Collins, less comprehensively, states that the order should be:

```
half-title preface
frontispiece contents
title list of illustrations
bibliographical details introduction
dedication TEXT
errata index
```

¹ The word 'postliminary' might well be used, but although genuine it has the look of having been invented for the purpose. American designers sometimes use the terms 'front matter' and 'end matter'.

Every book, however, is a problem in itself; conventions should not invariably be treated as laws. As in much of book design, careful thought is more likely than habit to bring about a good result. No formula can be relied on unless the reasons behind it are known.

One sequence in which the preliminary and back pages may reasonably be arranged, unless their nature suggests some other, is this:

half-title TEXT frontispiece or dedication appendixes notes bibliographical details and country abbreviations glossary of origin bibliography contents acknowled gements list of illustrations preface index introduction colophon (any of these last seven items appearing in the back errata (any of these last five items to begin either recto or verso, as pages beginning either verso or convenient and economical) recto as convenient).

In the following discussion of the various items in detail, reasons for the position of each in this list are put forward.

§103 · THE HALF-TITLE

Whatever the original purpose of this first page of the book, its advantage now is that the endpaper is fixed to it and not to the title-page. More is said about endpapers in § 191; here it is enough to mention the usual method of 'tipping on', by which a narrow strip of the endpaper along the folded edge is pasted to the page which faces it. When the book is opened, the free leaf of the endpaper is turned to the left, and its back tends to draw up the half-title to which it is pasted. The pasted part of the endpaper also covers part of the half-title. When there is no half-title it is the title-page which rises from the flat when the book is opened, and part of

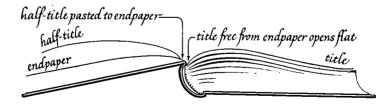


FIGURE 31. Part of the value of the half-title is to enable the title-opening to open flat when the endpapers are tipped on to the outermost pages of the text.

which is hidden by the endpaper. This hardly interferes with its function, but does detract from the appearance of the most important single page in the book.

The wording of the half-title should be kept to the minimum; the title of the book and of the series if any are usually quite enough; the author is usually left out. The treatment too should be inconspicuous; small capitals are often used. The conventional position of the setting is about two-thirds of the way up the page; those who like unity in book design may prefer to range it with the title or with the chapter headings. An elaborate, conspicuous, or unusually placed half-title may be mistaken for the title itself.

The half-title is sometimes used to give the title of the series of which the book is a part, and perhaps the name of the series editor, if these are not to appear on or facing the title-page.

§ 104 · THE BACK OF THE HALF-TITLE

If there is an ordinary half-title its back may be as much of a problem as its front. There is nothing which is required by convention to appear on this page, and it is often left blank. If there is no frontispiece, the blank page faces the title-page; and since most title-pages contain more than enough white space already, blank paper is the most conspicuous feature of this very important opening of the book. The use of space to emphasize and to show off display setting is a feature of good typography, but too much space may overwhelm the type.

The back of the half-title is sometimes used for a synopsis of the book, in order to assist library readers in their choice; or for a list of other works by the same author, whether or not they may be relevant to the book in which they appear; or for a summary of the author's credentials or distinctions; or indeed for anything else the publisher may wish to appear there. In an important book at least, this conspicuous and emphatic position—opposite, and in a sense balancing, the title-page—is hardly suitable for such items, although the dedication may well appear on this page.

The frontispiece is sometimes printed on the back of the half-title, and sometimes the title is spread across the whole opening to occupy that page as well as its own (figures 32-33, §§ 105-6).

§ 105 · THE FRONTISPIECE

The frontispiece is generally understood to be the illustration facing the title-page; among the obsolete meanings of the word is that of 'the title-page including illustrations and table of contents'. It is a pity to restrict

¹ Shorter Oxford English Dictionary. The definition suggests an arrangement with interesting possibilities.

FRUITS FOR

of God; graft, set, plant, and nourish up trees in every corner of your ground; the labor is small, the cost is nothing, the commodity is great; yourselves shall have plenty, the poor shall have somewhat in time of want to relieve their necessity, and God shall reward your good merits and diligence."

—AN OLD ENGLISH HERBAL



THE HOME GARDEN



By U. P. HEDRICK

OXFORD UNIVERSITY PRESS · 1944

LONDON NEW YORK TORONTO

to disappear into the spine of the book. Reduced from 83 in. deep.

the position of a frontispiece; certainly it usually faces the title-page, but it might with equal effect face the first page of text, or appear elsewhere in the prelims.

A frontispiece should be chosen purposefully; if it is to face the titlepage, it should be a picture suitable in every way to be seen beside the title of the book. The object of a frontispiece which faces the title is to enhance the title-opening, and the picture is therefore best as the lefthand part of a single design. If the picture stands upright on the page, it will be more closely related to the title than if it lies on its side. The title refers to the whole text of the book, and the subject of a suitable frontispiece may well do the same, unless its intention is simply decorative. A really striking frontispiece may appear to unbalance the title-opening, and to deprive the title itself of its proper emphasis; pictures in full colour are however of ten used. Line drawings (§ 122) harmonize best with most titlepages, but are rarely used as frontispieces. More common are continuoustone (§ 125) pictures of some kind; if these have to be printed separately from the text, those processes may be preferred which enable the typographer to match the colour and surface of the frontispiece paper closely to that of the title-page. If the text is printed by letterpress, a continuoustone frontispiece may be printed on paper similar to the text paper by a surface or recess process (chapter 15). A frontispiece printed separately from the text is often tipped into the prelims (fixed to a page by a strip of paste along the inner vertical edge); a tipped page, however, is always likely to come loose when the book is forcibly opened, and rarely lies as flat as it should, so that it should always if possible be guarded in (§ 192). Some 17th-century books, even cheap editions such as those of the Elzevirs, were generously decorated with two engravings printed on the same side of four pages wrapped round the prelims; one of these engravings formed the title-page, the other faced the first page of the main text—an admirable custom which, like much that is good in printing history, has been neglected by revivalists.

If the frontispiece must have a caption, an inconspicuous style of setting will ensure that the caption appears to refer only to the picture and does not seem to be a major feature of the title-opening. The caption may be useful to adjust the balance between the frontispiece and the title opposite.

Treatment of the frontispiece and title as separate elements of a single design may lead on to experiments in which title and frontispiece are combined in some way (figures 32 and 33). If the title-opening is to consist of a picture, title, author's name, imprint, and so on, there is no reason except custom for limiting the picture to the left-hand page and placing everything else on the right. A freer kind of treatment is outlined in § 107.

§106 · THE DEDICATION

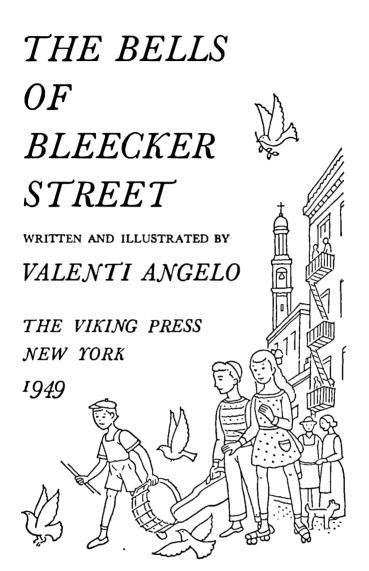
The authorities quoted at the beginning of this chapter agree that the place for the dedication is on the first recto after the title-page, and that it should face the biblio and imprint on the left. Now the biblio and imprint, and the other minutiae that often appear on the back of the titlepage, have less to do with the actual text than almost any other items of the book; they are concerned with the mechanics of publication rather than with the creative effort of the author. Seen beside these necessary but not particularly elegant items, the dedication loses some of the importance it may be intended to have. A more suitable position would be opposite the title-page, if there is no frontispiece, on the back of the half-title. On the right would be the title of the work and the name of its author; on the left, the name of the person to whom it is dedicated. If the dedication is not intended earnestly enough to appear in so conspicuous a position, it is hardly worth including at all. Placed opposite the title-page and matched in style, the dedication can strike a balance and improve the unity of the opening; if treated in a reticent manner it will not appear to be equal in importance to the title. If the title-page is to be faced by a frontispiece, the dedication may appear opposite the first page of the main text, in an opening second only in importance to that of the title-page.

An obvious difference between these two suggestions and the prevailing convention is that by custom the dedication is always on a recto page. Indeed, as Simon points out, all the preliminary items except the biblio, imprint, and frontispiece, and all the items on the back pages, as well as the main text itself, usually begin on a recto. This is presumably because the first page of every book (in any left to right script) is a recto, and the recto has therefore come to be regarded as the front of the leaf, and the verso as its back. Since, however, most books are intended to be read consecutively, with text on the left as well as on the right, there is no reason other than custom for placing important items on one side rather than on the other. The balance of the prelims does not benefit from the succession of blank left-hand pages that may result from brief preliminary items. In paper, in printing-press capacity, and in binding, blank pages cost just as much as pages full of text. Since half the book may already consist of unprinted paper, in the form of margins on the text pages, the addition of blank preliminaries is in effect the processing of paper in such a way that it is of no use whatever and yet has to be sold at a high price.

The custom was by no means followed by all the great printers of the past. Aldus did not hesitate to place a dedication on the back of the title-page, nor William Morris even to print the title-page on the left of an opening. Tradition is not always a certain guide to style in typography;



FIGURE 33. Title-page and frontispiece by Valenti Angelo and Morris Coleman. Reduced from $8\frac{3}{8}$ in. deep.



many of the great master-printers of history, from whose practice traditions should presumably derive, were far from patient with conventions.

§107 · THE TITLE-PAGE

The title-page usually appears on a recto page, preceding everything in the book except the items already described in §§ 103-6.

A title-page of the conventional kind usually consists of two groups of display lines separated by an extensive white space. When the opposite page is blank, white paper becomes the dominant feature of this important opening. The opening is one which more than any other in the book may claim admiration as a pattern, but if one page only is printed the pattern will be hopelessly unbalanced.

Typographic authorities since William Morris have rightly agreed in pointing out that the opening of two facing pages is the unit of book design; when the book is opened both pages lie flat before the reader, and they should be presented in such a way as to combine in a well-balanced pattern. Certainly 'the enjoyment of patterns is rarely the reader's chief aim'; but once the demands of utility have been met, decorative effect should be considered in the arrangement of any printed page. In the title-opening, in particular, where the brevity of the wording may enhance legibility, there is scope and even need for decorative invention in arrangement.

For these reasons the title is sometimes extended to the left-hand as well as the right-hand page and sometimes the frontispiece spreads to the right-hand page from the left (figures 32 and 33, §§ 105-6). At the time of writing this style is quite often used in America but is rare in Britain. A frontispiece which is printed with the rest of the text lends itself to this kind of arrangement. Instead of being tall and narrow on one page only, the picture may be wide and shallow; or it may fill the left-hand page and encroach into that part of the right which is not occupied by display lines.

When two facing pages are combined in this style to form a title-opening, the division between the pages must be taken into account. The reader may see the opening as a wide oblong; the designer must remember that it consists of two separate pages. Part of the inner edge of each page will be swallowed by the backing, and type and illustration must not be allowed to disappear into this little canyon. If a long title is designed to be set across both pages, the word-spacing should appear to be even throughout; the type of any display line which crosses from one page to the next should be conspicuously larger than, or separate from, that used for display lines intended to be read down one page only. If display lines of

I STANLEY MORISON: First principles of typography.

LIVRE

De Perspectiue de Ichan Cousin

Senonois, maistre Pain Gre à Paris,



A TARIS.

De l'Imprimerie de Iehan le Royer Imprimeur du Roy és Mathematiques.

1560.

AVEC TRIVILEGE DU ROT.

similar emphasis are arranged opposite each other on separate pages, care will be needed to prevent the eye from reading across the opening instead of down the pages. If the two facing pages appear to be of equal importance, the reader accustomed to title-pages on the right only may not be sure which he should look at first; if one page is more important than the other, the difference should be emphasized.

Not all title-pages offer an opportunity for a double-page treatment, but almost any can be set in a style other than the conventional manner described earlier. The purpose of the title-page is to describe the contents of the book and its origin. As a rule this is interpreted to mean little more than the name of the author (with a minimum of biography and literary achievement), title (and sometimes sub-title or description), the name of the publisher, and the place and date of publication. The title and author's name are grouped towards the head of the page, the rest is grouped towards its foot, and a large white gap stretches between. This gap has no virtue of its own, as space; the space used as margins, or to separate chapters from each other, has a purpose, but the gap on a title-page is there only because there is nothing to put in it. This space might reasonably be used to accommodate a short list of contents, which would amplify the title.

Leading printers of the past, particularly during the 16th century, sometimes enriched their title-pages with a device (figure 34). Devices of various kinds are still in use (figure 35), but they usually belong to the publisher; nor is the standard of design much better than in the early days of printing. The old devices were often of imposing size; they filled the whole space between the name of the author and that of the printer. The modern publisher's device has so shrunk that the white gap in the middle of the page is only partly filled. The rather heraldic style of drawing which characterized the old device is out of fashion, but a versatile artist can still produce a formal design which even in a large size will not overpower the display lines on the title-page. As the sponsor of the book, the publisher has the right to print his device on the title-page; but if he does not wish to exercise this right, he may well allow the author or the printer to do so. The device does not of course have to appear on the title-page; in the Oxford Lectern Bible designed by Bruce Rogers, for instance, the specially drawn device is printed on the last page of all, where 'it typifies our fervent "Laus Deo" on completion of our long task'. I

There is no need whatever for the title-page setting to extend at its widest and deepest to the edges of the area occupied later in the book by the text setting. In a book designed in the conventional style, the title-page

¹ An account of the making of the Oxford Lectern Bible (Monotype Corporation, 1937: not for sale).





Left—Oxford University Press: designed by Bruce Rogers. Right—Cambridge University Press: designed by Sir William St. John Hope.





Left—W. S. Cowell of Ipswich: designed by John Lewis. Right—Phoenix House: redrawn by John Ryder from an Aldine device.





Left—Cassell & Co: designed by Eric Gill. Right—The Nonesuch Press: engraved by Reynolds Stone.

FIGURE 35. Some devices used by printers and publishers.

setting usually looks best if it is more or less the same shape overall as that of the page itself, or rather narrower. A fairly long title-group will naturally lend itself to a treatment of this kind, but, for a title consisting of one word or little more, another style may have to be found to avoid a composition which distorts the sense.

The arrangement within groups of the title-setting may be varied from book to book. The title, as the most important item, is usually at the top of the page. Some typographers believe that the most conspicuous position on the page is not the top but a point nearer the 'optical centre'—about two-thirds of the way up the page. Acting on this belief, they like to set the title at this level; and, to fill the gap above it, they set the author's name over the title.

In a group of display lines the widest tends to appear one of the most important, and for this reason the title itself is often set in a style which makes it the widest on the title-page. If this cannot be done, a rule above or below the title, and wider than any other line on the page, may be used to emphasize the title; or at least one line of the title-group may be set wider than any line in the imprint group, in order to emphasize the precedence of one group over the other.

A title-page can be greatly improved by a skilful use of colour; since this entails an extra printing charge, colour is usually restricted to books for which quality in presentation is more important than the saving of a few pence in production, or to those in which an extra colour is already to be used. Colour looks best if used for whole lines or groups of lines rather than in small spots; or if a device or picture or ornament of any kind is used, to print it in colour may prevent it from appearing to compete in emphasis with the title.

It is curious that the title-page wholly engraved in wood or metal is so rarely used in Britain, although writers on typography generally agree about the importance of the title-page in arousing the interest of the reader in the appearance of the book. Part of the reason is, of course, the cost of having the whole page drawn or engraved by a skilful artist; part, that too few artists are capable of satisfactory lettering; and part, that title-pages are usually regarded as an opportunity to display typographic skill, and as an introduction to the design of the rest of the book, so that a plain text requires a simple title-page. The cost of designing and engraving a pictorial title-page to be printed in one colour would, however, be considerably less than the sum often spent on a jacket which is certain to be thrown away before long. To commission work of this kind would not only reward the few artists capable of doing it well, but might lead young artists to acquire the necessary skill in the hope of future commissions. To choose and instruct an artist and to arrange satisfactory process engraving are just as

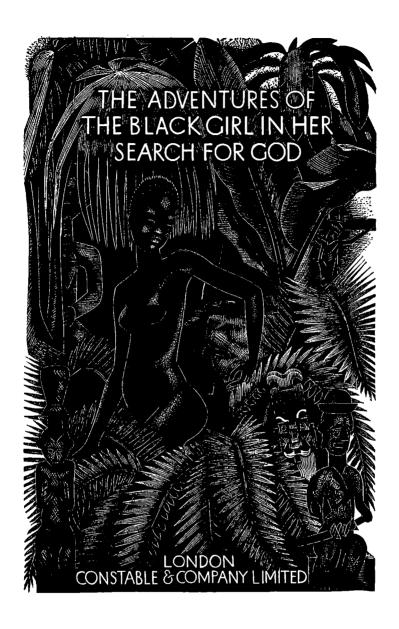


FIGURE 36. A wood-engraved title-page by John Farleigh, planned in collaboration with Bernard Shaw. Reduced from 8½ in. deep.

much a part of the skill of the modern typographer as the arrangement of type.

The use of engraving leads into an interesting field of title-page design. The title or even the whole page may be written by a calligrapher and reproduced by line-block; the lettering may be combined with a pictorial design; or a type-set title-page may include hand-drawn decoration. If a second colour is used, type or lettering may be printed over a plain or ornamental panel; or by the use of a reversed line-block, the lettering may be white on a coloured background. The title-page is the typographer's chance to use his invention as well as his skill, and the inventive typographer will be able to think of other uses for engraving on the page.

Art paper—in its most familiar form a dead white, hard, smooth, and shiny material—is one of the most necessary and least pleasant of materials in modern printing. It sometimes has to be used for the entire text of a book; and when this is done, the setting of the title-page is something of a problem. The dominant feature of most title-pages of today is unprinted paper, which is pleasing when the paper itself is a pleasant material. A large expanse of art paper, on the other hand, is not a sight that will please everybody; that gleaming chemical whiteness is at its best when covered with half-tone dots, is tolerable when its surface is patterned with type, but is unsightly when in its natural state. One possible treatment for a title-page on art paper is to cover the surface with a half-tone, the lettering of the title-page being combined with the illustration, either in black or white, without being broken up into dots.

The general treatment of the title-page depends upon the typographer's opinion of its nature. If its purpose is considered to be mainly one of advertisement, or decoration, it may be elaborate in design, like the package of an expensive commodity. In this form it offers a considerable opportunity to creative imagination and technical skill, and bears very little resemblance to any other page in the text. If the purpose of the page is considered to be mainly that of displaying a simple announcement in a dignified manner, a plain and simple treatment, similar to that of the text, will be better; the opportunity is one of a more subtle and limited kind. This latter attitude to the title-page is the most common among British typographers, but this by no means proves its validity for all kinds of book.

§108 · THE BACK OF THE TITLE-PAGE

American law requires that the country of origin be named on the titlepage of any book imported into the United States; by a concession, the country can be named on the back of the title. Even if American sales may not be expected, the words PRINTED IN GREAT BRITAIN should appear on the back of every title-page, in order to forestall possible difficulties. Just as the title-page is sometimes considered to be the most important single page of the book, so the back of that page is usually treated as the least important, and is used for a dumping-ground for details which interest the average reader little or not at all. The imprints of the publisher and of the printer, and the bibliographical history of the book, are commonly printed there, in addition to the name of the country of origin. These details are easy to find if they always appear in this position, and they are less likely to be lost in re-binding than if they are printed at the back of the book. On the other hand, accidents in re-binding are comparatively rare, and, unless it is considered that the imprints and biblio should be read before the main text, they may as well appear after it.

An advantage of leaving the back of the title-page blank (except for PRINTED IN GREAT BRITAIN) is that there is less likely to be type showing through the title-page. If any line or groups of lines printed on the back of the title-page are aligned as far as possible with those printed on the front, the show-through will be minimized.

If the preliminary pages are kept to a minimum, as they may be in a novel, for instance, the back of the title-page may be useful for the list of contents, and the text can then begin on the first recto after the title.

§109 · THE LIST OF CONTENTS

Simon and Collins agree in placing the list of contents in the midst of the prelims; according to the former, the dedication and acknowledgements should separate it from the title-page, and according to the latter, it should follow the preface. In these days of brief and often cryptic titles, however, the list of contents no less than the title-page may help to describe the nature of the book. The title-page states the theme of the book; the list of contents, if the chapter-titles have been well chosen, may enlarge the description of the scope of the book, and arouse the reader's interest to the point of sustained reading. The list of contents too may well be consulted by the reader more often than other pages in the prelims, and so may require a position where it will be found easily. For these reasons the best place for the list of contents may well be on the first recto after the title-page.

When chapters have numbers but no titles, there is little if any need for a list of the numbers, since such a list is unlikely to be of any use. In some technical books, and sometimes even in fiction, the list of contents includes a synopsis of each chapter. This improves the explanatory function of the list, and may provide a valuable guide to a complicated text arrangement.

The preliminary pages will appear to harmonize with the text pages if heads are treated in much the same style throughout and if the text fount

is used for the prelims as far as possible, and this applies to the list of contents as well as to the subsequent items. If chapters are to follow on instead of beginning on new pages, for instance, the preliminary items might well be treated in the same style.

Not all readers today can read roman numerals at a glance, and some readers cannot read them at all, except in numbers under 10. Their use for any important purpose is an anachronism, and they are particularly unsuitable for a list of contents containing a large number of chapters. The roman system of numbering is such that no two successive numbers are indicated by the same number of characters; thus the roman numeral one has one character, two has two, three has three, four has two, and five has one. When set one above the other, roman numerals make an irregular column of uneven width. Certainly arabic numerals have the same fault, but not to the same degree; the only unevenness likely to appear in a list of chapters is between 9 and 10.

The best style for numbering is perhaps to set chapter numbers in arabic numerals which range with the capitals, if such numerals are available, and to set page numbers in numerals which range with lower-case letters. Failing this, chapter numbers and page numbers, if set in the same kind of numerals, may be distinguished from each other by their position. The convention of placing chapter numbers on the left and page numbers on the right is so rigid that omission of the words *chapter* and *page* from the list of contents is unlikely to lead to confusion; certainly omission makes a neater page. Nor is there any need for a point after the chapter number if it is separated by an adequate space from the chapter title. To omit chapter numbers also makes a clearer page, but gives the impression of a collection of articles, essays, or short stories.

Brief chapter titles, consisting of a word or two only, will be quite clear enough if set in capitals or small capitals. Longer titles will be easier to read if set in upper and lower-case, whether roman or italic, and are also more likely to fit into a single line if set in this style.

There is no need to set the list of contents in the same measure as that of the text, unless most of the chapter titles are so long as to need a wide measure. If page numbers are set, as they usually are, in a column, the use of a narrower measure will bring them near enough to the chapter titles for the connection between title and number to be obvious without the use of leaders (figure 37). Nor need the chapter titles always be ranged at the left and page numbers at the right; the tradition of centred display lines, for instance, may be applied to the arrangement of the list of contents.

Throughout the preliminary and back pages a setting which is wider than it is deep, or as wide as deep, is apt to look awkward on a page which is much deeper than its width. The use of narrow measures, particularly

CONTENTS

	Introduction	page vii
I	The one-eyed giant	I
2	The sorceress	16
3	The land of the dead	27
4	The destruction of the ship	35
5	The island nymph	44
6	The house of Odysseus	56
7	The kind princess	64
8	The hospitable king	75
9	The faithful swineherd	88
0	The son of Odysseus	99
ΙI	The return of Odysseus	110
[2	The wife of Odysseus	123
13	The bow and the axes	137
14	The battle with the suitors	153
15	The father of Odysseus	165

FIGURE 37. A contents page, set in a narrower measure than the text and without the word 'chapter'. The text measure is shown by the horizontal border. Set in Ehrhardt and reprinted from type.

in the list of contents, is therefore to be recommended, and a short list of contents may look well if its depth is increased by generous leading.

If, as already suggested, the list of contents is to appear on the title-page, the simplest and least conspicuous treatment possible will have to be used if the chapter titles are not to distract attention from the title itself.

§110 · THE LIST OF ILLUSTRATIONS

This is in effect a supplementary list of contents, and is perhaps best placed immediately after the list of contents, and treated in much the same manner. A good place for it is the back of the page on which the list of contents appears. Illustrations printed with the text are usually listed separately from plates, folding maps, and so on. This is partly because when illustrations are printed with the text their page numbers in the list refer to the pages on which they appear; the page numbers in the list of plates, maps, and so on often refer to a separate system of page numbers or to those text pages which face the illustrations. This would be avoided if pagination were to follow the style suggested in § 171, and that kind of page numbering would facilitate the serial numbering and listing together of illustrations of every kind.

The treatment of the list of illustrations may have to be different from that of the list of contents, since the captions to the illustrations may be longer than the chapter titles. Captions are very much less important than chapter titles, and should perhaps be treated in a less emphatic style.

§111 · INTRODUCTORY TEXT

The several items which may be grouped together under the name of introductory text may comprise preface, foreword, and introduction; the group may also include items with such home-made names as author's preface, prefatory note, and so on.

The design of these items of introductory text is to some extent a matter of taste. Some authors prefer them to be less emphatic in appearance than the main text, and suggest a smaller fount or less leading. This is reasonable so long as the prelims do not become conspicuously less attractive and legible than the main text. Probably the margins, fount, and leading chosen for the main text will make the most legible page in the introductory text—a smaller fount, for instance, might fit too many ens into the line. If the style of the introductory text is to be less emphatic than that of the main text, it would be consistent to set the heads of preliminary items in a slightly less emphatic manner than those of the main text.

Anything vital to the main text should if possible appear in the main rather than in the introductory text. Many readers have the habit of passing over the preliminary pages and plunging straight into the main text. This may be a bad habit, but it has to be taken into account.

§112 · ERRATA

The preliminary pages of a new work are often printed last, and, by the time they go to press, mistakes may have been discovered in the text which has already been printed. Any such mistakes may be put right in the prelims under the heading *corrigendum* or *erratum* (if there is one mistake only) or *corrigenda* or *errata* (if there are several). These Latin phrases are of course quite familiar, but an English phrase such as 'correction' may be understood more quickly and generally.

Perhaps the best place for the corrections is the last of the preliminary pages, where they will be conspicuous and easy to find.

§113 · ARRANGING THE PRELIMS

Although in deciding how the prelims should be arranged the typographer should bear in mind the careless reader who ignores them, the book should be designed in general for the conscientious reader. It does seem reasonable, then, to include in the prelims everything that the reader should see before he begins the main text, and to postpone to the back of the book those items to which he will refer after beginning the main text, or which need not be read until after the main text.

The convenience of the publisher and printer may, however, have to precede that of the reader. Usually, anything that may have to be altered in the course of time is placed in the prelims, and experienced bookprinters submit proofs of the prelims before reprinting the book. This enables the publisher to bring the biblio (and the imprints, too, if necessary) up to date, and to insert any corrections that may have been found, and offers the author a chance of rewriting any parts of the introductory text which may have become out of date since the previous impression. Some printers also pull proofs of back pages as well as prelims before reprinting, and there should be no difficulty in placing a standing order for this to be done. This should enable variable items to be placed in the position most convenient to the reader, whether among the preliminary or the back pages.

Preliminary pages are often numbered in roman lower-case numerals, in order to separate their pagination from that of the main text. Pages may then be added to the prelims after the main text has been paged (separated into pages and numbered) without changing the numbering of the main text pages. When the prelims of a new work are printed separately from the rest of the book, the printer may have to add a blank leaf to make a

convenient number of pages, converting 10 pages to 12, or 14 to 16. This blank leaf usually appears at the very beginning of the book, and is not numbered. When the book is reprinted, the prelims are often combined with the first part of the text and printed with it, and if there is no need for the blank leaf it can be omitted. Since it was not numbered, there is no need to change the numbering of the preliminary pages.

The first page of the main text may be considered to be the most important single page after the title-page; if the title-page has convinced the reader that the book is worth his while, it is on the first text-page that he begins his work in earnest. Even when there are no mechanical factors to prevent the main text from beginning on a verso, it should begin on a recto in accordance with custom if the reader is not to be puzzled and taken by surprise.

The items which follow the main text are referred to here as 'back pages'; in some printing offices they are known, together with the prelims, as 'tops and tails'.

§114 · APPENDIXES

The back pages are a part of the book similar in importance to the prelims and to the text itself. They may well therefore begin on a recto page, and may even be preceded by a half-title.

Collins says that the plural 'appendices' is an anatomical word, and that 'appendixes' should be used in books, but Fowler (*Modern English Usage*) does not agree.

Appendixes are items appended to the main text, and therefore as a rule come immediately after it. The factors which govern the style of setting of the introductory text may be taken to apply to the appendixes. The numbering system may be clarified by the use of appendix numbers different from those of the text; that is, if the chapters are numbered chapter 1, chapter 2, and so on, the appendixes may begin with appendix A.

Comments made above about the use of roman numerals, running items on, and starting each item on a recto, apply to the back as to the preliminary pages. There is no need to number the back pages by any system different from that used for the main text.

§115 · NOTES

If the notes, whether by the author or by the editor, are collected together at the back of the book, a good place for them is immediately after the text, unless there are appendixes; appendixes are nearer to being part of the main text than are notes. For this reason notes are usually set in smaller type than the main text, partly to indicate their comparative importance

and partly to save space. Care should be taken to make the notes legible; if a very small fount is to be used, and the measure is to be that of the main text, the notes may have to be set in double rather than in single column, which would contain too many ens for comfortable reading (figure 20, § 90). Figure 20, together with figure 17 in § 80, show what handsome arrangements are possible when the text page contains extensive notes.

References to the text, with which each note usually begins, need to be easily picked out from the notes themselves. If there is room, they may be broken off from the notes and set in a line by themselves; or there may be a white line between the notes. If the notes contain many phrases set in italic, textual references will be clearer when set in another alphabet such as small capitals or even bold face.

§116 · THE LIST OF ABBREVIATIONS

Like the notes, these are for reference after reading has been begun, and so may reasonably appear at the back of the book. Small type is usually used for the abbreviations, and, as definitions are nearly always short, the type is sometimes set in two or more columns. If entries are distinguished from each other by the indention of turn-over lines, there is no need to begin each with a capital. Since the list is for reference rather than for sustained reading, and because the lines are short, no leading is needed. If the abbreviations themselves are set in italic upper and lower-case, a comma will be enough to separate them from the definition in roman upper and lower-case. If some of the abbreviations are English and others foreign, roman and italic may have to be used for them, and the division between abbreviation and definition emphasized, perhaps by an en rule. Turn-over lines may be indented to make the actual abbreviations stand out.

§117 · GLOSSARY

Since it is intended to be used in the same manner, the glossary is interchangeable in position with the list of abbreviations, and the two are sometimes combined. If the definitions are rather long, the glossary may be set in much the same manner as the notes; if the definitions are short, the style of the list of abbreviations may be more suitable. The suggestions above about the use of capitals, italic, commas, indention, and turn-over lines for abbreviations apply equally to glossed words.

§118 · BIBLIOGRAPHY

There are several kinds of bibliography. One is a list of the books used in the preparation of the book in which the list appears. Another is a list of books recommended by the author for further reading on the same subject. A third, more commonly treated as an advertisement, is a list of other books by the same author. The best place for this last is perhaps the jacket, since the reader of one particular book is unlikely to have any permanent need of this list of titles unless they are related in subject to the book in which they are listed.

All these kinds of list, and more, are usually entitled 'bibliography', which has the merit of brevity if not of clarity. A clearer name which is equally brief is not easily found, but some distinction between the different kinds of bibliography would be useful. The three already mentioned might perhaps be entitled 'Authorities', 'For further reading', and 'By the same author'.

Hart and Collins both suggest in considerable detail a style for the setting of references to authors and their works. Whatever the style, it should be consistent not only throughout the list but throughout the book.

Collins (under the heading 'authorities') shows how reference may be made to volume, part, chapter, section, and paragraph, by the use of different kinds of numbers, combined with section marks of various kinds; the use of roman numerals, in small capitals as well as in large, cannot, of course, be avoided. A slightly longer, but equally clear and perhaps more attractive, arrangement is to abbreviate such words as volume; this makes possible the use of arabic numerals throughout:

vol. 3, pt. 4, bk. 1, chap. 15, sect. 9, para. 27.

§119 · ACKNOWLEDGEMENTS

These usually appear in the prelims, partly perhaps as a polite gesture to the persons mentioned in them, and partly because alteration may be needed when the book is reprinted. Acknowledgements which are collected into a single list usually refer to minor assistance such as the loan of photographs or of original material, or perhaps to some help with proofs. If such acknowledgements as these appear before the main text, the reader—if he is one who actually reads the prelims before the text—has not, when he reads them, any reason to appreciate the help which is acknowledged. The best place for such acknowledgements, then, is after the main text; by the time the reader reaches them, he will know what they are about. Most of them are in any case a polite gesture to helpful people, or a formality required by some firms in addition to a fee for the use of material, rather than an item of information for the reader. A precise and comprehensive list of acknowledgements may be of some use to the publisher himself, indicating the source of material he may need again. Whenever possible, acknowledgements for illustrations should be collected into a single list rather than set under pictures to which they refer; the effect of the picture is not enhanced by a credit line which is of no interest to the reader.

The other kind of acknowledgements list is that which may affect the reader's attitude to the text, and this should certainly appear in the prelims. If a comparatively unknown author receives substantial help from a famous expert on the subject of his book, the text will carry more authority than if headed by the author's name alone. Help of this kind may suitably be acknowledged in the preface, or, if it is to be included with lesser acknowledgements in a single list, the acknowledgements may appear in the prelims, perhaps after the preface and before the errata.

§120 ⋅ INDEX

The index is usually the last part of the book to be written. Notes, appendixes, and so on normally appear in the page proof, but until the page-proof stage the composition of the index cannot as a rule be begun. For this reason the index is always the last, or very nearly the last, major item of the book. It is also easy to find in that position, and may be taken to catalogue all references which have preceded it, whether in the prelims, text, or back pages. Sometimes notes, appendixes, and so on are set in a smaller fount than the main text, and the index is set in a smaller fount still; then to place the index at the end extends the downward cadence of type-size.

The style of the index deserves careful thought. Unless it is an index of first lines in a book of poetry, it is nearly always set in two or more columns. If there is adequate space between the columns, there should be no need to separate them by rules.

The smallest founts of some series appear to be microscopic, because of their low x-height; the reader may be better served by a fount from another series which has a larger x-height. In spite of the narrow measure, a fount which is large on the body will look well if leaded, though leading cannot be described as essential here.

As usual, the less punctuation, consistent with clarity, the better.¹

The division between letters of the alphabet needs care, particularly when the index is a long one. Perhaps the clearest style—certainly one of the most attractive—is to set a single capital in the space between divisions. This takes up extra space but does not unduly emphasize the first entry under each letter as does a large initial, or the setting of the headword in small caps. At the very least in a long index there should be a white line between the letters; in a short index the division between letters may not require any special treatment.

¹ Collins suggests a method of punctuation under the word 'index'.

Small type and close-set lines are common in indexes, for the sake of economy. By the time the index has been compiled the rest of the book is usually in page proof, and the typographer may find that to make an even working (§ 213), making the book up to the nearest multiple of 32 or 64 pages, he can spread the index out rather than cram it in. It is not difficult, by means of a slightly larger fount than usual, extra leading, and displayed letters above each section, to design an unobtrusively lavish style for the index which will please the eye as well as filling space. On the other hand, if the index still overruns an even working when set in the tightest possible style, the author may be prepared to delete enough entries to make a fit, though this is a dubious expedient.

§121 · THE COLOPHON

The word 'colophon' is derived from the ancient Greek word for a summit or finishing stroke. It is defined in the Oxford English Dictionary as 'the inscription or device, sometimes pictorial or emblematic, formerly placed at the end of a book or manuscript, and containing the title, the scribe's or printer's name, date and place of printing, &c. . . . In early times the colophon gave the information now given on the title page.'

A colophon, then, is sometimes understood to be what has been called earlier in this chapter a device, the pictorial insigne of the printer or publisher. The word is sometimes applied rather loosely to an imprint, whether of printer or publisher, and to the place and date of publication, if this is not included in the printer's imprint; it is, however, used here in the sense of a summary of the circumstances of the book's manufacture and publication.

These various items, which it is suggested here may be collected into a single setting, are often scattered about a page or more, and set in various styles. Often there will be found, on the back of the title-page, or elsewhere in the prelims, the publisher's address in roman upper and lower-case near the head of the page: the history of the book's publication and other bibliographical data about half-way down the page; and, at the foot, the printer's imprint, in small capitals. Since all this consists of information of various kinds about the book's production, it might well be better set in a coherent style. As for its position, the few readers who are interested in such information are unlikely to have any use for it before they have read the text of the book; the typographer often prefers to keep it off the back of the title-page, in case it shows through; and in general its best place may be at the very back of the book. If there is no room for it there, it may have to be transplanted to the prelims.

The composition of the colophon is not primarily the responsibility of

the typographer, but he may be able to influence its arrangement. At its most comprehensive, it may include:

the biblio
the publisher's name and address, and branches if any
printed in Great Britain (if the colophon is on the verso of title)
the name of the printer
other details about manufacture
the name of the illustrator

The biblio, which is a summary of the bibliographical history of the book, should state at least the date of publication, the date of each subsequent edition, the number of impressions, and the date of the present impression. These details are often needed for reference, and should be given even in books considered ephemeral.

Printed in Great Britain must in any case appear on the back of the titlepage; if the colophon appears elsewhere, there is no need to repeat the phrase.

No details of manufacture, other than the printer's imprint, are essential, but more details are sometimes given.

The name of the typographer is often mentioned in American books, but very rarely in British books. The American attitude is that any functional and decorative success achieved in the production of the book is due to the designer, who deserves credit for it; in Britain, any such self-advertisement on the part of the typographer in his role as an interpreter is considered intrusive for the same reasons as a tendency to individual ideas in book design is deprecated. To make a habit of mentioning the typographer's name may tempt the ambitious designer to advertise his individuality by means of oddities of style; never to mention it is to disregard the value of an important contribution. In the distant future, when books which demonstrate the development of industrial book design may be a matter for study and collection, just as the early history of printing is studied today, the work of master-hands will be hard to trace.

Perhaps the best solution is that publishers, once they are aware of the importance of sound design, should decide whether or not the typographer should be named in each book, and that the name should appear only when the design is considered to be a feature of the book—that is, when the planning of the book's manufacture has required unusual skill and taste, and when that skill and taste have been successfully used. At other times, an able designer might be allowed to 'sign' his books in the most unobtrusive possible way. Few people are in any case likely to care who

¹ It is a curious fact that in the catalogues of the National Book League's annual exhibition of book design before 1954, not a single designer is named, although the list of 'credits' is comprehensive enough to include, for instance, process-engravers and paper merchants.

designed the book, but for the benefit of those few the information may well be given on suitable occasions.

Some publishers like to mention the type-face in which the book is set; when this is done, the name of the composing machine should be stated, as a matter of courtesy to the makers as well as of information to the reader. A discriminating public is the best possible guarantee of the maintenance of quality in book production, but it is doubtful whether many readers will ever become familiar with more than a very few type-faces.

The paper used in the book, important though it is, should perhaps be left unnamed. It may be changed at the last moment, or between impressions, and an inaccurate description may be left unaltered in the colophon.¹

In theory the binder has just as much right as the printer to have his name mentioned in the book. The binder may, however, be changed between impressions, or even during impressions. Edition binding is a mechanical technique, and there is very little evident difference between the products of reputable binders working with the same material on the same book.

If the illustrations deserve it, the artist's name may already have appeared on the title-page or elsewhere in the prelims. Otherwise, for instance, when the book is illustrated by diagrams and simple sketches, the artist's name may well appear in the colophon. The information may one day be useful to the publisher, and even for simple work the artist needs professional credit. The alternative is to allow the artist to write his name on every picture, which rarely improves the picture's appearance. Certainly the designer of the jacket should not be named in the book, since jacket and book are almost sure to be separated eventually.

One deciding factor which may influence the inclusion of certain credits in the colophon has already been suggested. Most industrially produced books are 'all of a piece' in point of quality: paper, printing, decoration, binding, and so on at their best are good rather than fine. If, however, a book is distinguished by one or more notable features, credit for those features may well be given in the colophon. If the type-face used is particularly appropriate to the subject of the book, or is of interest to the reader for some other reason, this may be explained. When the plates are an important part of the book, the firm which printed them should be named if they were not produced by the printer of the text. The name of the binding cloth is not of much interest to the reader, but he may wish to know if it has some unusual quality such as being insect-proof or water-proof.

Those items which deserve inclusion in the colophon, then, are those which are obligatory; those which are useful or interesting to the reader,

¹ This has actually happened in a post-war book about book production.

librarian, publisher, or bookseller; those which are worthy of permanent record; and those which are due to the individuals and the organizations associated with the book's production.

A comprehensive colophon is more likely to be read if designed as far as possible as a single item, rather than scattered down the page in a variety of styles. The simplest style is to set it as a paragraph, perhaps with the same tall and narrow proportions as the page itself. Another method is to break the wording into lines and to centre each (figure 30, page 169); this may make an attractive pattern, but may also be uncomfortably reminiscent of a tombstone.

The order of items suggested in this chapter is not more than a suggestion. Certainly no order should be accepted as standard, though a formula of some kind may be useful in the preparation of run-of-the-mill books. The guiding principle in the arrangement and presentation of preliminary items and those on the back pages should be the convenience of the reader; the reader should, on the whole, find in the prelims what he needs before reading the text, in the back pages what he needs after doing so.

In presentation, the principles of legibility, relative emphasis, and decorative effect suggested in earlier chapters naturally apply to 'tops and tails'. In these pages the typographer may find opportunities for his skill not less worth-while and more diverse than those offered by the text page. The more spectacular pages, such as the title and contents pages, should not be allowed to monopolize his attention at the expense of less striking features such as the index. Above all, he should remember that for every minute the reader spends on the prelims as a whole, he may spend an hour on the text.

BOOKS

CAREY, G. V. – Making an index (Cambridge authors' and printers' guides, number 3) – Cambridge University Press, 1951 – pamphlet.

DE VINNE, THEODORE LOW – A treatise on title-pages, with numerous illustrations in facsimile and some observations on the early and recent printing of books (The practice of typography) – New York, 1902 – illustrations.

See also, after chapter 1, JENNETT, ROGERS, and SIMON; after chapter 7, BIGGS (The use of type); after chapter 8, UPDIKE; after chapter 9, MORISON and STEER; after chapter 10, BURBIDGE; after chapter 11, GRAY; in § 240, JOHNSON, LEE, MORISON (all three titles), and TSCHICHOLD.

Letterpress blocks

The term letterpress is defined as 'contents of illustrated book other than the illustrations, printed matter relating to illustration', and in this sense it is often used in the book trade. Among printers, however, the most frequent use of the word is to mean the relief process of printing, by far the oldest and most widely used of printing techniques.

The principle of the letterpress printing process is to lay ink on certain parts only of the paper and to leave the rest of the paper unprinted. Ink is conveyed to the printed parts of the paper by a printing-surface; for the printing of the page now before the reader, the printing-surface has been cast in the form of types. Part of the European invention of printing from type was the use of a rectangular frame or chase, into which the letters were wedged with spacing material in various forms. All this spacing material, and also those parts of the upper surface of the type which do not print—as, for example, the centre of the letter o—together form the non-printing surface of the forme. This surface does not print because it is recessed below the printing-surface. The ink-rollers of the press pass over the printing-surface and leave it covered with ink, and the inked surface and the paper are then pressed together to form a print; the nonprinting surface remains clean and untouched. The letterpress printing process, then, is that in which the printing-surface differs from the nonprinting surface only in level.

Like many terms of the trade, the word 'block' has more than one meaning. It is used as a verb, to describe the process by which lettering or decoration is stamped into the cloth cover of a book. As a noun, a block is understood by binders to mean the stamping die, and by printers to mean a letterpress printing-surface produced by photomechanics, etching or carving, not by casting or electrolysis; the term also includes the non-printing surface and the wooden or other base on which the whole is mounted. This chapter deals with the photomechanical block.

§122 · MAKING THE LINE-BLOCK

The principle of the letterpress process is that the unprinted parts of the paper are untouched; if black ink is used the paper is either printed black or unprinted white—there are no greys. The easiest kind of picture or other image to print by this process is therefore one which consists of lines or masses of solid colour on a background of unprinted paper. A picture of this kind is reproduced by a comparatively simple photomechanical process, which is used for most book illustration where elaborate effects are not required. In this book it is used for most of the text illustrations showing pages from actual books, as distinct from specimen settings.

The image to be reproduced must be black and white in the sense that although the 'black' may be brown or even blue or other colours, and the 'white' may be light green or yellow, there must be no merging between the two fundamental colours. Variations in either of the colours of the original—a black which has faded to grey in places, or a white which has become discoloured here and there—may be correctly translated into black and white by the camera if they are only slight, but no subtleties of colour can be reproduced. The original must also be flat in surface; the appearance of a third dimension cannot be reproduced.

A special camera is used for process-engraving. It stands on a runway along which it can be moved, and the mounting board stands at one end of the runway. If the original image is to be reproduced in its own or a larger size, the camera is moved close to the mounting board; usually the camera is set some way back, to reduce the size of the reproduction. If the printed image is to be reversed from left to right as compared with the original, the camera is focused directly at the original; otherwise it may be turned at right-angles to the mounting board, and takes its photograph through a right-angle prism.

A glass plate, coated on one side with a transparent light-sensitive emulsion, is fixed into the back of the camera. The original is lighted by powerful lamps, and the lens of the camera uncovered for an exposure of suitable length. Light from the image is reflected through the lens on to the plate; where the black lines or masses of the original are reflected on to the plate, the emulsion is unaffected, but where light shines on to the plate from the white areas of the original, it changes the constitution of the emulsion. The plate is taken out of the camera and so developed that the emulsion which has been exposed to light becomes opaque, while the rest remains transparent. This is a photographic negative. All the emulsion is hardened and can be stripped off the glass and fixed to another plate the other way round, if at this point the picture has to be reversed from left to right.

The negative is touched up at this stage, since transparent spots may

appear in the blackened surface, or black spots in the surface which should be transparent. Opaque paint is used for touching up the black areas, and the transparent areas are scraped clean if necessary with a knife. By the same means, alterations may be made to the image; what is to be printed as a mass of lines, appearing on the negative as transparent lines, can be deleted by being painted out, or more lines can be added by scratching with a sharp tool.

It is in fact possible to dispense with the camera by coating a plate of glass with opaque material and creating a transparent image by scratching and scraping. The slight saving in cost and gain in directness will not often be found to be worth the extra trouble.

If the image is to be reversed in colour—that is, if its blacks are to appear as white and its whites as black—a glass plate is coated with the same light-sensitive emulsion and light is shone on to it through the negative while the two plates are in contact. When developed, the second plate is a contact positive—a transparent plate on which the black parts of the original are reproduced as a black, opaque image.

A sheet of polished metal is trimmed to suitable size. When the illustration contains no fine lines, a comparatively soft and cheap metal can be used, and such blocks are engraved on zinc. For this reason the line-block is sometimes known as a zinco, but as zinc is not always used the term is a misleading one. When fine lines are to be printed from the block it has to be engraved in a harder metal, and copper is used; this is more expensive and more durable than zinc.

The metal is coated with a light-sensitive emulsion which before exposure is soluble in water. The negative is fixed tightly over the metal and the emulsion is exposed through the negative to powerful lamps. Where the coating is protected against the light by the opaque parts of the negative, it remains soluble; where the coating is exposed to light passing through the transparent parts of the negative, it is hardened and rendered insoluble.

The metal plate is now covered with greasy, acid-resistant ink. When it is washed in water the unexposed parts of the coating dissolve and take with them the layer of ink in which they were covered, leaving those parts of the plate bare. The printing image remains on the plate in the form of a coating of hardened emulsion protected by ink. This protection is increased by the use of an acid-resistant resinous powder, and the plate is subjected to an acid-bath. The acid etches away the bared parts of the plate, but the protected image cannot be attacked by the etch. Repeated etches cut away the non-printing surface down to the necessary depth, and extra cutting is done with a drill known as a router. Then the block is finished and ready for mounting; the printing image stands up in relief above the non-printing surface.

The block is nailed to a mount of wood, or of whatever material the printer may prefer, by nails which pass through drilled holes in the whites of the design. Unless the design consists almost entirely of lines and solids with only minute interstices of white, the nails can all be placed inside the design. The mount and the block are then trimmed together to a rectangular shape which just encloses the outermost lines of the image. A

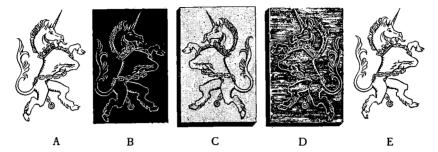


FIGURE 38. When a line block is made, the original (A) is photographed. If focused directly at the original, the camera will produce a negative reversed from left to right; but a prism may be used to produce a negative the same way round as the original (B). The negative is laid face down on a slab of metal, and so after exposure reproduces on it an image of the original reversed from left to right (C). This is etched until the image stands up in relief (D), and a print from the block reproduces the original (E).

good blockmaker usually cuts the block and its mount to within $\frac{1}{32}$ of the image. Some publishers and printers now have all their blocks fixed to metal mounts instead of to wooden ones.

§123 · MECHANICAL STIPPLES

By means described in § 175 an artist can simulate grey tones in a line-block; cross-hatching or stippling with a pen are among the most commonly used methods. There are also mechanical means of doing this, known as mechanical or Ben Day tints. Since 'tint' suggests a variety of colour, it is not a good term for what is in fact a variety of tone or intensity in the same colour. The mechanical tint is an area of stipple, ruling, or pattern which can be applied by an artist to his drawing (when it will be reduced or enlarged with the original) or by the process-engraver to the negative (when the black pattern will appear white in the final print) or to the block itself before etching (when it will appear in facsimile). The most frequently used of these tints are the least attractive, such as the even tone of dots often used to differentiate sea from land in maps reproduced by line-block. There are however, some tints of irregular grain which might

be used more often, and there is room for the invention of some more attractive textures. Limited though the range is, a skilful and imaginative artist can make a feature of his use of tints in book-illustration (figure 39). Laying the tints on original, negative, or block is simple enough, but keeping them off small areas of the surface if necessary is a laborious task, and adds considerably to the cost of the block. The cheapest use of mechanical stipples is when they are applied to the original.

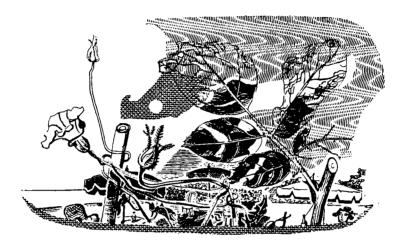


FIGURE 39. An illustration by John Rothenstein, much reduced, in which mechanical stipples are an essential part of the design, not a decoration subsequently added.

§124 · PRINTING THE LINE-BLOCK

Like type, line-blocks require the right paper-surface if they are to give the best result. Blocks which include heavy solids should not be printed on a rough paper in case the grain of the surface shows through the ink. A rough surface tends to distort the thickness of any line, and should be avoided as far as possible. A very lightly drawn illustration may look best if printed on a smooth but rather soft paper which will tend to strengthen all the lines slightly and evenly.

Perhaps the most conspicuous advantages of the line-block, and the cause of its very widespread use, are first that it can be printed with the text on any paper suitable for type, and second that it is produced by extremely direct means—the processes through which passes the artist's work, or whatever the original may be, are almost entirely mechanical, requiring the least possible aid from the hand of a re-toucher. But however widely used the line-block may be, its potentialities are too often neglected by artists and designers.

§125 · THE HALF-TONE BLOCK

The line-block is capable only of a black and white result. The invention of photography, however, made necessary the invention of a process enabling the letterpress printer to reproduce originals continuous in tone from white through various shades of grey to black. A true reproduction of such an original remains impossible by the relief process, but a compromise is available.

The principle of half-tone reproduction is that the printing-surface consists of a pattern of dots. Where the dots are large, they run together, the non-printing surface consists only of small pits, and the area appears to be dark grey or black; small dots, surrounded by white, give a light grey effect. Variations in the size of the dots have the effect of printing all the shades of grey between, although in fact every dot is solid black and the paper between the dots is untouched by ink.

Any kind of original which can be photographed, from an X-ray to an oil-painting, can be reproduced by this process. The value of the process, however, is limited by the difficulty of printing on any but a perfectly suitable surface. The space between the dots which form the printingsurface is necessarily small, and it is impossible to etch the non-printing surface to any great depth without weakening the foundations of the neighbouring dots. The non-printing surface is therefore only a very slight distance below the printing-surface. If a half-tone block is printed on paper which is too rough, extra pressure and extra ink will be needed to transmit ink to all parts of the uneven area to be printed. The ink will then tend to fill the narrowest and shallowest pits in the printing surface, and parts of the rough paper surface will tend to be forced into the pits, so that black spots will appear in areas which should appear to be evenly grey. The distance between dots, and therefore the depth of the nonprinting surface, can, however, be adjusted in block-making to suit the surface that will be used.

When an original is photographed for reproduction by half-tone, the photographer places in the camera, between the original and the negative, a glass screen ruled with a rectangular grid of fine diagonal lines. Light reflected from the original through the lens is broken up, on passing through this screen, into the diagonal pattern of dots of various sizes which composes the conventional half-tone. The pattern is made diagonal in order to be inconspicuous; if it were vertical, the alternating channels of white and rows of black dots would be more obvious. (There is perhaps an analogy here with the preference of most typographers for types with diagonal stress.)

§126 · SCREENS

The frequency of the dots is determined by the gauge of the screen ruling, and this is described in lines to the inch. Newspapers are printed at very high speed (which prevents rich inking) and on newsprint paper¹ (which is not particularly smooth in surface and tends to be uneven in thickness), and the coarsest screens—usually between 45 and 80 lines to the inch—are used. In book production, half-tones of 100-screen are often printed on machine-finished paper, which is neither particularly rough nor particularly smooth. 120-screen is suitable for a smooth paper of good quality; for a satisfactory result the paper should have received a really smooth finish from super-calendering. When a screen of 120 lines or less is used the pattern can be seen quite clearly, and a certain amount of detail is lost by the breaking up of the image into a coarse, visible pattern of dots.

If illustrations contain detail which is essential, and if they are an important feature of the book, a screen of 133 lines or finer should be used. The pattern now becomes inconspicuous, and quite delicate detail can be effectively reproduced. Ordinary book paper, however, will not be smooth enough for a really satisfactory result, and the printer will have to use a paper which is either loaded in making with a high proportion of mineral (imitation art paper) or is coated with mineral after being made (art paper). The mineral surface is smoother and harder than any fibrous surface; its affinity for fine-screen half-tones depends on its quality. 133-screen is suitable for imitation art paper, for art paper with a dull or matt finish, and for the cheaper grades of glossy art paper. If blocks are to be 150-screen, a good art paper and careful printing will be necessary. For blocks of 175 and 200-screen the very best of art paper and of presswork will be essential; such fine screens are rarely used in blocks made for book production.

Choice of screen is largely a matter of experience, the results of which will show that these criteria are only approximate. Half-tone printing is a matter of individual skill, and if there is any doubt about screen the engraver or the printer should be given a sheet of the paper to be used and an outline description of the work to be done, and his opinion asked.

The screen already described is the conventional type, used in the conventional manner. The screen pattern, which is one of the least attractive features of half-tone reproduction, naturally requires to be as inconspicuous as possible; special screens are therefore rarely used in book production, and their possibilities tend to be ignored. Screens of any kind are extremely expensive, and few engravers are equipped with a range of special screens which would hardly ever be used.

¹ For definitions of the various kinds of paper, see § 184.

Some special screens, not often available, are intended either to provide a non-geometric screen pattern, or to emphasize the regularity of the pattern. A one-way screen has lines ruled in one direction only; on the block the lines are thin for the lighter tones, thicker for the darker. A cross-hatched effect develops in the darkest tones of all. A screen of this kind may be used effectively if its ruling, whether vertical or horizontal, is parallel with the main lines of the original, particularly where those lines run for the most part in one direction.

A one-way screen in which the lines are curved has a striking effect on an original where roundness is to be emphasized. The result is perhaps too striking to be used repeatedly throughout a book; a one-way screen with wavy lines may have a less vertiginous effect.

The result of all one-way screens is to emphasize the screen-pattern; this device is seen at its most effective when the screen-pattern is related to the structural pattern of the original. Perhaps the most interesting of all special screens for book-production is the grained screen. The Erwin and Hatte screens break the original image up into irregular patterns of fine grains; there is some loss of contrast, but the result is unobtrusively pleasant. This kind of screen can be used to particularly good effect to reproduce pencil drawings, because of the affinity between the grain of the drawing and that of the screen. The screens can be used on a reasonably smooth text paper.

Coarse half-tones, under 85-screen, are usually etched in zinc, like coarse line-blocks; finer screen half-tones are etched in copper.

§127 · ETCHING AND MOUNTING

The etching of a half-tone block is a subtle business in which the craftsman uses his skill to interpret the original. Without careful adjustment during etching, emphasizing the darkest and the lightest tones, the reproduced picture would seem flat and appear to lack contrast. It is at this point in the process that the mechanic has to assist any artist whose originals are prepared for half-tone reproduction. The intervention of the craftsman, though necessary, deprives the process of directness, which is always the surest guide to faithful reproduction. Protection of the dots in the darker tones against the etch, and exposure to it of those in the lighter tones, in order to adjust the relative emphasis of the tones, is known as fine etching.

If the screen to be used is rather finer than would be usual with the paper, the result may be improved by etching deeply. The screen should be 120 or less, and the non-printing surface between the dots is etched rather deeper than usual. The block may then be printed with rather more

pressure than would otherwise be possible. The support of the dots has, however, been undermined, and care must be taken not to use such blocks for too long a run.

The term 'deep-etch' (as distinct from deeply etched) is used in connection with half-tones to describe a type of block often used to reproduce pencil drawings or similar originals, in which areas of perfectly white space are a feature of the picture. The block is made in the usual way, and those parts of its surface which reproduce the drawn lines are protected with an acid-resist which is painted over them; the rest of the block is exposed to etching until the unprotected dots are eaten away. In the same way the background of a half-tone picture can be cut away to emphasize the important part of the picture, or can be vignetted—caused to fade gradually away.

When etching is finished the block is trimmed, usually to a rectangular shape. While trimming the block the engraver can, if necessary, raise a neat line of metal alongside the trimmed edge, to emphasize and protect the edges. This is no longer common in books, though still used by newspapers.

Since the ordinary half-tone block presents no areas of white through which it can be nailed to its mount, it has to be bevelled or flanged along the edges, and holes for the nails are drilled through this flange. This method of mounting is of some importance to the designer; the flange is about $\frac{1}{8}$ " wide, and if a block is flanged all round, no caption or other block or other material can be placed within $\frac{1}{8}$ " of it. If two flanged blocks are placed side by side they will, of course, print their pictures about $\frac{1}{4}$ " apart. The flange can, however, be left off and the mount cut square with the edge of the printing surface on one side of the block, or on two opposite sides, but not on two adjacent sides. When several half-tones are to be grouped together, separated only by a thin white line, the engraver may have to mount the negatives together on glass, draw in the dividing lines, and engrave and mount the whole group as a single block. Each block prepared in this way costs substantially more than if it were mounted separately in the usual way.

§128 · COMBINED LINE AND HALF-TONE

The line process is commonly used to produce unrelieved blacks and whites, the half-tone process to print a variety of greys. By combining the two processes, solid black and solid white can be mixed with grey. There are several ways of doing this; a line and a half-tone negative can be superimposed over each other when printing the image down to metal, or they can be printed down separately, or the line part of the design and

the half-tone part can be cut out and mounted on glass after being fitted together like a jigsaw puzzle. The engraver can also convert parts of a half-tone negative to produce a solid black from the block by scraping the image away: or to produce a solid white by painting over parts of the image. No separate original is needed for this simple method, only clear instructions with the original for the half-tone.

§129 · ORDERING BLOCKS

Engraving costs can be substantially reduced if the engraver can group a number of originals together, and treat the group as a single block until they are mounted and separated. This is possible only when several negatives are marked for the same reduction or enlargement. The simplest way of limiting reductions to a few groups is to mark all originals with the proportion in which they are to be reproduced, rather than with the measurement to which they are to be reduced.

When the engraver has finished making the block he pulls a set of proofs and sends them to the person who ordered the blocks. If the typographer works somewhere other than in the printing-office, he should make sure that a set of the engraver's proofs of half-tones reach the printer. Engraver's pulls are as a rule admirably proofed on the best art paper, and although the printer, working in less favourable conditions, may not be able to achieve so successful a result, he can use the engraver's pulls as a standard for printing. Whenever possible, however, sheets of the paper to be used by the printer should be sent to the engraver for proofing, to provide a guide which the printer can expect to match.

BOOKS

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- CURWEN, HAROLD Processes of graphic reproduction in printing Faber and Faber: new edition, 1947 illustrations: bibliography. [An explanation of illustration techniques, with demonstrations of their uses.]
- GAMBLE, CHARLES W. Modern illustration processes: an introductory textbook for all students of printing methods Pitman, 3rd edition, 1950 illustrations: bibliography.
- SMITH, W. J., E. L. TURNER, and C. D. HALLAM Photo-engraving in relief: a text-book intended for the use of apprentices and others interested in the technique of photo-engraving Pitman, 3rd edition, 1951 illustrations.

Letterpress printing

The letterpress process, the principle of which was explained at the beginning of chapter 13, was the first of all methods of printing, and in spite of subsequent inventions it remains by far the most often used printing process in book production. Until photo-composition becomes general the text of the book has to be set up in type, whatever the printing process; only the letterpress printer can use the type itself as a printing surface others have to pull proofs of it and reproduce them by photomechanical means. The great majority of new books in Britain are printed from type; and even if the success of the book is probable, and reprints are expected, duplicate plates (§§ 131, 132) can be made without the use of the camera, and a wide variety of different kinds of printing surface is one of the characteristics of the process. The technique of letterpress printing is far from simple; the adjustment of printing pressure or impression to the nature of different areas of the printing surface requires care, skill, and time, and the result depends to a large extent on the relation between the character of the printing surface and that of the paper. Partly because most books are printed by letterpress, partly because of its complexity, and partly because it depends for success more upon the designer than do other printing processes, the technique of letterpress printing needs to be understood in detail.

§130 · PRINTING FROM TYPE

Type is, of course, the cheapest of all printing surfaces, and for text printing it is one of the best; properly printed, the letters are as sharp in outline as their designer intended them to be. One of the minor disadvantages of printing from separate types is that the spaces between the letters tend to rise to printing height and to print a black rectangle among the words; one of the advantages is the ease with which corrections or alterations can be carried out even during printing.

The choice between type and duplicate plates is sometimes one of the most difficult decisions in book production. If more than about 5,000 copies are printed from type, or if a hard or rough paper is used, the type

may begin to wear visibly, the letters losing their sharpness of outline. Only a worn surface is then available for reprints, though the first impression of the book should be thoroughly satisfactory. If stereo moulds (§ 131) are taken from type before printing begins, the type will be worn by the moulding before its first use, and the quality of the initial printing from type may be second-rate; stereos cast from the moulds would, of course, be satisfactory, but casting is usually uneconomical until the need for duplicate plates is certain. Electro-moulding (§ 132) inflicts less wear on the type; but for a really satisfactory result with the plastic electro-moulds now coming into general use, the type should be cast initially with shoulder-high spaces, which make successful printing from type extremely difficult.

Type-metal is an alloy, consisting of small proportions of tin and antimony added to lead, and since lead is the main component the alloy is not conspicuously hard. Any process which entails heavy pressure on the type—and proofing, stereo-moulding, make-ready (§ 136), and cleaning after printing are such processes—inflicts more wear on the metal than a great deal of actual printing, unless the force of impression is heavy and the paper harsh. After careful proofing and make-ready, if stereo-moulding has not been necessary, and if the printing is a light impression on a sympathetic paper, type may still be tolerably sharp at the end of a 100,000 run, and runs beyond 500,000 have been recorded. Printed with a similar impression on the same paper, but after stereo-moulding, repeated proofing and heavy-handed make-ready, the same type may be worn out before 25,000 copies have been completed.

The proportions of the component metals in the alloy vary according to the method of casting. The softest alloy is that used by the Linotype, which casts the largest piece at a time. Linotype metal is therefore more vulnerable than other kinds of metal; proofing should be kept to a minimum, and electro-moulding is preferable to stereo-moulding if the type is to be used for a subsequent printing. Monotype metal is considerably harder, and if a long run from type is expected a particularly hard alloy may be used, though this slows down the caster. The hardest metal of all is founder's metal, which is cast at the slowest speed; its hardness is often increased by a small addition of copper.

The comparative hardness of metals is measured by the Brinell test, in which a rounded weight falls with even velocity on the surfaces to be tested, and the width of the dent is measured. The composition of any kind of printing metal may vary to some extent, but the Brinell hardness of a typical alloy for the Linotype is 19, that of a typical Monotype alloy 27, and that of a founder's alloy 33. Brinell hardness gives some indication

¹ Printing metals (Fry's Metal Foundries Ltd, 1936).

of the ability of different metals to withstand wear in printing, but is not an exact guide.¹

Any printing-surface used in letterpress may suffer from batters before or during printing. Single types which have been battered can be put right in a moment by a compositor with a handful of type; a slug, however, can be set and cast only on the machine, which may have to be specially prepared for this correction. This fact, and the difference in hardness between single-type and line-cast metal, is part of the reason why single type is generally preferred for book composition in Britain. When the type is not to be used for printing at all, as in newspaper work in Britain, and much bookwork in America, there is less disparity between the advantages of the two casting methods.

§131 · STEREOTYPING

Stereotyping is the simplest, and at present the least expensive, method of preparing duplicate printing-surfaces from type or from other relief surfaces. For any but the smallest type and the most delicate detail, stereo-plates can be made to provide a duplicate whose impression is all but indistinguishable from the original. The plate can be corrected if necessary, though if elaborate alterations are necessary re-setting and re-moulding may be cheaper. Line-blocks without fine detail such as a delicate stipple can be duplicated in this way, but the technique is not suitable for half-tones made with the comparatively fine screens usual in bookwork. Line-blocks and half-tone blocks can be soldered into the stereoplate if not themselves duplicated with the type. Moulding and casting are carried out separately; to make moulds does not necessarily entail casting.

The mould is made of a kind of papier maché known as flong. The damped flong is laid over the type and forced against it by a powerful press, so that the flong receives a deep impression of the exact shape of the type; if the mould has not been pressed deeply enough into the non-printing areas the flong is beaten further into shape with a stiff brush.

The moulded flong is placed in a casting-box into which molten stereo metal is poured, filling the space between the flong and the wall of the box. When the metal has cooled, the cast plate is trimmed to size, and forms in one piece a duplicate, usually 12 points thick, of the original printing-surface. One mould will usually produce a dozen stereos if reasonable care is taken; with great care and good luck many more castings may be possible, but sometimes the mould will be worn out after two or three casts.

An ordinary stereo may continue to produce sharp prints at the end of a run of 100,000 or more, but much will depend on make-ready. If the

plate has to be made ready twice, its life may not be more than 80,000. The wear on any printing-surface varies so much according to the circumstances in which it is used that the only guide to its expectation of life must be experience. The endurance of the stereo can, however, be increased by 50–75 per cent. or perhaps more if it is nickel-faced. This is done by casting the plate in the ordinary way, and then placing it in an electrolytic bath where a thin sheet of nickel is grown by electrodeposition over its surface. This is a slow process and it adds considerably to the cost of the stereo, one of the chief virtues of which is comparative cheapness. Further, the printing-surface is increased in area at each edge by the thickness of the coating, and this may have a slight but unfortunate thickening effect on small type or fine detail. In the same way the stereo can be chromium-faced, but this is an unusual process in Britain; it increases both the cost and the endurance of the stereo still further.

The Brinell hardness of nickel is from 150 to 500, and of chromium from 200 to 1,000, according to the method of preparation. These metals are, of course, used only in thin coats, so that the hardness of the printing surface depends to some extent on the hardness of the alloy under the coat. A typical stereo metal has much the same composition as Monotype metal.

§132 · ELECTROTYPING

An electro is a more faithful, more hard-wearing, and more costly form of duplicate than a stereo, and is better suited to small type, to fine detail in line-blocks, and to half-tone blocks of any but the coarsest screens.

Some foundries still mould in wax; the surface to be moulded is pressed into a hard wax, which is then rendered electrically conductive by a coating of graphite. The coated mould is placed in an electrolytic bath, and a thin shell of copper is grown over its surface. The shell is stripped off the mould, laid face down in a tray, and backed up with a comparatively soft lead alloy. After being trimmed to size, the plate is similar to a stereo except that the printing-surface is made of copper.

Wax moulding is rather out of date for most purposes, but it may still be useful at times. If woodcuts or wood-engravings are to be duplicated, wax is unlikely to damage the original, because no heat and little pressure is necessary.

The more up-to-date foundries now use plastic electro-moulds. One common form of plastic mould takes its shape from the type under heat and pressure, and is set in shape as soon as it cools. The moulded surface is rendered electrically conductive by being sprayed with a silver compound,

and is then placed in the electrolytic bath. The plastic mould can be used repeatedly, but it is possible that some kinds of plastic may lose shape after a few years; this is not yet known for certain. The cost of moulding is not high, and the result is very faithful; type should always be cast with high spaces if the best possible result is required.

The deposited metal of an electro is several times as hard as the cast metal of a stereo. The cost of electrotyping may be double that of stereotyping, but the endurance of an electro may be a million or more impressions; its life, like that of any other plate, can be shortened substantially by hard treatment. If hard treatment is to be expected, the electro may be made with a nickel face. This is not deposited on an existing electro, but grown on the mould first of all; the copper coating is grown on top of the nickel, so as to be under it on the finished plate, and backing metal is poured into the doubly coated shell in the usual way. This double electrolysis increases the cost considerably, and is not often necessary.

§133 · OTHER PRINTING-SURFACES

The disadvantage of any autographic form of illustration (§ 173) is that the original and the printing-surface are the same; when the surface wears out the original wears out too. Lino-cuts naturally have a very short life; woodcuts will survive an edition of moderate length, if treated carefully; wood-engravings may endure longer runs. Sooner or later, however, they all wear out, and if there is any likelihood of a reprint the illustrations should, if possible, be printed from duplicate plates. The progressive wear on autographic illustrations is a good reason for the numbering of copies of limited editions; clearly the earlier copies may be better than the later. If, however, the book is well planned and carefully printed there should be next to no deterioration after a short run; in any case, the last copies of a limited edition seem always to be sold at the same price as the earlier copies, so that the numbering, although it has become a habit, has very little point.

In the same way as autographic relief illustrations, process blocks are often duplicated before printing if there is the slightest possibility of a reprint. The cost of moulding for either stereotyping or electrotyping is substantially less than the cost of new blocks, and even electro-moulds and plates are cheaper than half-tones. If the originals from which blocks are made may be difficult to obtain again, duplicate plates may save time and trouble as well as cost. A zinc half-tone or line-block is harder than a stereo but not so hard as an electro; a copper line-block or half-tone is harder even than an ordinary electro, being made of copper all the way through.



A. The original wood-engraving; caption printed from type.



B. Illustration and caption printed from a stereo.



C. A nickel-faced stereo made from wood-engraving and type.



D. Illustration and caption printed from an electro.



E. A zinc line-block made from a repro proof of the wood-engraving and type.



F. A magnesium line-block made in the same way as E.

FIGURE 40. Six kinds of relief printing-surface compared. Made from a wood-engraving by Neville Adams.

Discussion of the relative hardness of various printing-surfaces may be thought unnecessary by designers whose prime concern is with the appearance of the printed book. But the modern craftsman, like his medieval ancestor, has the privilege and duty of building to last. To plan nothing for an edition beyond the production of the first copy may result in deterioration not only of the last copies of the edition but of earlier copies as well. To foresee only the resistance of the first edition (or impression) against deterioration may result in a decline of quality in reprints. Every book must be so planned that however great a number of copies is likely to be needed, the last of all the printed copies need be very little worse in any way than the first, and that both will resist the attack of time as far as the materials of modern book production can do so.

§134 · MOUNTS

Type, woodcuts, and wood-engravings are all made to the right height for printing, which is type-high; other letterpress printing surfaces, such as blocks and duplicate plates, are made comparatively thin, for economy in price and weight, and require to be mounted to reach type-height. Wood mounts usually have to be surrounded by thin strips of metal, since the adjacent type should not be forced against the wood, so that type may be prevented from running right up to a block. Mounts can be pierced or cut away, so long as no part of the printing surface is left unsupported; an eccentrically shaped block does not have to be mounted on a mount with four sides only, though the sides of the mount should all be parallel with the edges of the type in order to simplify the task of locking up. Duplicate plates can be mounted individually on wood in the same way as blocks, and both blocks and plates can be individually mounted on metal; type can then run close up to the edge of the printing surface.

Blocks are usually supplied mounted on wood or composition of some kind. Since blocks have to be mounted on metal for moulding—fibrous mounts are unstable under heat and pressure—they should be supplied unmounted to the printer if they are not to be used for printing. If a book is to be printed from duplicate plates instead of type, the plates are mounted on a base of board or metal which is big enough to support the whole forme.

Duplicate plates and blocks when mounted in this way need be separated only by their flanges, and can occupy the full area of the mount if necessary. Plates and blocks of any kind can be mounted together. If half-tones are to be grouped closely together, they can be 'sweated' on to metal mounts and the flanges cut away.

§135 · IMPOSITION

The term imposition has two meanings. One sense, to which this section refers, means the arrangement and position of the pages in the forme for printing. Another, which means the position of the printed text on the leaf, has in effect been dealt with in chapter 4. The principles which govern the arrangement of pages in the forme apply not only to letterpress but to any printing process, and not only to type and blocks but to duplicate plates and any other printing-surfaces. Imposition is determined to a large extent by the requirements of the binder, which are described in chapter 19; it is the requirements of the letterpress printer which are considered here.

Imposition may require particularly careful planning if the book is to be printed from type. The full potentialities of printing techniques are available only to those designers who plan not merely a page but a forme, and this is particularly true where letterpress printing from type is concerned.

The outer frame of the chase is usually more than an inch wide, and if two chases (not often necessary now that folding chases are widely used) are laid side by side in the bed of the press the two frames together will occupy about 2". Chase bars may be slightly less than an inch wide. When type is locked up in the chase, it may be braced directly against the outer frame on two adjacent sides, but on the other two sides room must be left for the furniture and the quoins—perhaps 1" on each side. The printing-surface cannot therefore occupy the whole surface of the forme.

The chase is essential to the transferring of the type from the stone to the press, but once it is in the press the chase can be removed and the type braced against the edges of the bed as it was against the edges of the chase. This greatly increases the cost of imposition, since the chase will have to be used again to remove the type, but there are times when the expedient may be useful. The conventional style of the ordinary octavo book allows of margins which absolve the designer from concern with the chase and its components; it is the unconventional design, with bleeding blocks (page 218) and narrow margins, which may cause trouble and expense if planned with insufficient knowledge. Extremely small books, too, may give trouble because their margins may be very narrow even though conventionally proportioned.

The chase is, of course, substantially under type-height, and blocks and plates can, in an emergency, be fixed in position partly overlapping a portion of the chase.

There are many different kinds of imposition in bookwork, but nearly all fall into one of two categories. Sheet work, or work and back, means

printing the first side of the sheet from one forme, and the second side from another. If an octavo book is being printed on a quad press, 32 pages will be printed on one side of the sheet, and another 32 pages on the second side, so that the perfected sheet will be printed with 64 different pages.

Half-sheet work, or work and turn, means using one forme only for both sides of the sheet. Then, for instance, the same 32 octavo pages are printed on the back of a quad sheet as on the front; the perfected sheet, in fact, is printed twice from each of 32 pages. The arrangement is such that each half of the perfected sheet is printed with the same 32 pages. If an octavo book consists of 160 pages, or 5 formes of 32 pages each, 4 of the formes will probably be printed sheetwise, and the fifth imposed for half-sheet work.

The main importance to the designer of the difference between sheet and half-sheet work is in the incidence of extra printings such as colours. If black and red are to be used, for instance, and a forme is imposed for sheet work, an extra printing in red on one side of the sheet only will allow red to appear in every alternate opening throughout 64 pages, and the other side of the sheet may either be printed in another second colour, or may have no extra printing. If the forme is imposed for half-sheet work, the same second colour must be used for every page in each section of 32 pages, and both sides of the sheet will receive the second printing.

Most books are printed on quad sheets, which contain 64 octavo pages, and are bound in sections of 16 pages, so that each sheet makes four sections. The sections do not always have to be arranged on the sheet in any particular order, since all the copies of one section are separated from copies of the next before sewing. If some sections are to have more than one printing, they can sometimes be imposed together, and in planning illustrations in this way the typographer may reduce costs by restricting the extra printing to one side of one or more sheets. Thus if there is to be a double-spread two-colour illustration in the centre of each of four sections, those illustrations can all be printed on one quad sheet; but the addition of one more illustration of this kind will entail the increased cost of the extra printing of a smaller sheet.

Blocks which run off the edge of the page (bleed off) necessitate an adjustment in imposition. $\frac{1}{8}$ " of the block must be allowed to fall outside the cut edge of the page, and this means increasing the space between the bleeding edge and the near edge of the adjacent page by that amount. Since all the pages in the forme must be aligned for folding, the increase of $\frac{1}{8}$ " will have to be applied to every page on both sides of the sheet. To contain the bleeding block, the sheet will have to be $\frac{1}{2}$ " more along the short edge than if there were no such block. If the same block bleeds off the fore-edge of page 16 as well as the head, $\frac{1}{8}$ " must be added to the fore-

edge not only of page 16 but of all the other pages on the sheet; the paper will then have to be 1" longer along the long edge.

If the blocks are planned to bleed, then, they should, for the sake of economy, be planned as far as possible to bleed off the same edge of the page; if most of the blocks bleed off head and fore-edge, for instance, it may be wasteful to have one only bleeding off the tail as well. If a block

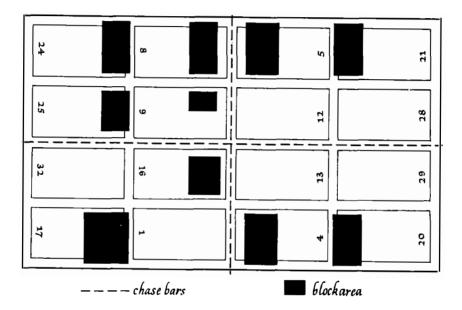


FIGURE 41. Diagram of a forme so planned by the designer that blocks bleed off the head and fore-edge only throughout, in spite of a variety of block sizes, and none of the bleeds adjoins a chase-bar.

bleeds off only one edge of one page, blocks may bleed off the same edge of every page on the sheet without extra use of paper.

The cost in extra paper of allowing blocks to bleed should be reckoned before the style is finally determined. The cost per copy of bleeding may not be very high, but the total amount over a long run is certain to be considerable. In addition to this, the extra size of sheet necessitated by pictures imposed in this style must be borne in mind when format and sheet size are being planned; if a forme is planned to occupy the whole

¹ For example, if a book with no bleeds has 320 pages, and 25,000 copies are printed on sheets of paper $35\times45''$ and weighing 100 lb. a ream (§ 185); a similar book, with blocks bleeding off three cut edges would need a $36\times46''$ sheet weighing 105 lb. a ream—and the bleed would necessitate more than half a ton of extra paper.

bed of a certain press, and the sheet has then to be increased to accommodate the extra cut, a larger press will have to be used and the cost of printing may rise substantially.

If the printing-surface lies within the cut edge of the page, its outermost edges should always be $\frac{1}{4}$ " or more from the edge of the sheet; $\frac{1}{8}$ " has to be allowed for cutting, and the same amount to bring the printed area safely on to the page without approaching the trimmed edge too closely. If on the other hand there are bleeding illustrations at the outer edge of the forme, an economically minded typographer may wish to bring the printing-surface to within $\frac{1}{8}$ " of the edge of the sheet. This is just about as close as is safe, but the printer must be allowed $\frac{1}{4}$ " to $\frac{1}{2}$ " along the gripperedge—the edge of the paper which is fed to the press—for the grippers which hold the paper as it is drawn round the cylinder and printed. In order to achieve accuracy in backing up, the same gripper-edge is used for the printing of each side of the sheet; the lateral position of the sheet on the cylinder is adjusted by a side-lay against which one side of the sheet is laid before the grippers take hold of the sheet, and this side-lay is changed from one side of the press to the other when the sheet is to be perfected.

§136 · MAKE-READY

The quality of letterpress printing depends to a considerable extent on the exact adjustment of printing pressure to the differing nature of different parts of the forme. The larger the area of the printing-surface, the more impression it needs, so that, for instance, a bold capital needs more impression than a comma. This adjustment, a lengthy process, is completed before printing begins. Since some of the preparation has to be carried out with the forme in the bed of the press, the press remains unproductive during part of make-ready, which as a result is extremely expensive. The high cost of this work is one of the characteristics of letterpress printing, since a very considerable expense is incurred before printing begins. If the run is a short one, the cost per copy of make-ready is high; as the run increases in length, the cost per copy becomes less of a burden.

The first stage of make-ready is to underlay any of the printing material which needs to be brought up to type-height and to be made to stand square on its feet; in particular, blocks on wood mounts, since they tend to warp and shrink, have to be underlaid. Underlaying can usually be carried out before the forme goes to machine. Plates and blocks, and of course type, which have become worn after much printing, need a comparatively heavy impression, in order to produce a strong and even print.

Overlaying can be completed in part before the forme goes on machine, by mechanical means. It entails making what is in effect a relief model of those parts of the printing-surface where the most pressure is needed, and fixing it in position on the cylinder of the press, in order to increase the pressure locally. With type-matter, duplicate plates, wood-engravings, and blocks mounted on metal, a more detailed form of overlay is carried out when the forme is on the press, to adjust any local unevenness of pressure.

Interlaying is carried out between the block or plate and its mount by inserting there different thicknesses of paper, to raise or lower very slightly the printing surface in accordance with its nature. It is usually necessary only for half-tones; the areas which are lighter in tone, the high-lights, have no interlay under them, the darkest tones have several thicknesses of paper beneath, and the intermediate tones are raised by intermediate and appropriate amounts.

In addition to attending to individual parts of the forme, the pressman has to place an appropriate dressing on the cylinder. This dressing or packing consists of sheets of paper, linen, and card, fixed firmly and smoothly round the cylinder, to provide a resilient support for the paper and to prevent the damaging contact of the metal cylinder on metal type. The thickness and nature of the packing governs the weight of the impression over the whole forme; make-ready causes only local adjustments to this pressure.

The hand-press and hand-made paper require soft packing and a heavy impression, to compensate for the uneven pressure of the press and for the varying thickness of the paper. Many of the types now in use are based on letters designed for printing in this manner; their thin main-strokes are seen at their best when thickened by an impression which forces the face of the letters deep into the paper. This kind of printing is associated with the typography of the past and of the private press, with the types of long ago, with paper of a rough individual surface, and so with much that is great in printing. This association is the main reason for the surviving popularity of a heavy impression, 'the third dimension of letterpress printing'. Impression of this kind, however, is an anachronism; it tends to distort the reproduction of the printing-surface, to accelerate its deterioration by wear, and to cause an unsightly corrugation of the back of the sheet unless the paper is thick. If a book of many pages is printed heavily on thin paper the impression, thickening the text area but not the margins, may cause serious difficulty in the bindery. The depth of the dent in which each printed letter appears may be held by some to enhance the decorative value of the page, but can hardly be supposed to improve its legibility, and may even distract attention slightly from the letter-forms

themselves. A medium impression is usually quite adequate for the reasonably smooth, hard and even machine-made papers now generally used, and for the precision-built printing-presses of today. A medium impression may be defined as having just enough force behind it to ensure a solid print without obvious indention or distortion, and the majority of text types now in use need no more. Line-blocks can be printed with the text by this means, and even with thin paper the sheet is only slightly indented.

Probably in the future a light impression will become more generally used. It requires a hard, smooth, and ink-receptive paper of perfectly even thickness, an extremely accurate press, and strongly drawn letters. At present this kind of impression is possible as a rule only with paper of the best quality. Unfortunately very few of the text types shown in chapter 8 appear at their best without any artificial thickening whatever, and it is possible that this shortage of suitable founts will delay the more common use of a light impression. Printing of this kind, however, reduces to a minimum both the wear of the printing-surface and the distortion of its reproduction, and lays the printed image on the surface of the paper where it can most clearly be seen.

The adjustment of position between forme and sheet (register) is an important part of make-ready. The simplest print of any kind has to be placed on the paper at exactly the right distance from the edges of the sheet, if the margins are to have their intended width. When the sheet is to be printed more than once, register between previous and subsequent printings has to be adjusted and maintained with extreme accuracy, because although a variation in a margin of a small fraction of an inch may not be noticeable, the failure of two or more printings to coincide adequately in the making of a single image will be disastrous. The tolerance for inaccuracy in colour printing is less than $\frac{1}{100}$. Register is almost as important when the sheet is backed up, particularly if the paper is not perfectly opaque; if the lines of type on each side of the page are not registered accurately, the type on the verso may be seen between the lines on the recto.

Exact register depends to some extent on the size of the printed sheet. No paper is entirely stable in size, and the larger the sheet the larger its expansion and contraction in varying humidity and under the pull of the cylinder. A quad size sheet may be found too large for really accurate colour work, unless part only of the forme is to be printed in colour and the colour pages can all be grouped in the part of the sheet nearest to the lay-edge and gripper-edge of the sheet. Dimensional instability may also become very troublesome if close-register work is attempted with duplicate plates, because of uneven shrinkage in moulding, casting, and electroplating.

§137 · INKING

The materials and methods of inking are governed by the nature of the printing-surface, of the impression, and of the paper. The actual amount of ink used is adjustable not only over the whole forme but over parts of it. Different kinds of ink are used according to the method of drying. When art paper is to be used, the ink will hardly penetrate at all into the paper, and must dry almost entirely by oxidation on the surface; the same form of drying is necessary with very thin paper. Supercalendered and other hard smooth papers need an ink which will dry partly on the surface and partly by penetration into the paper. Antique and other absorbent papers allow the ink to dry mainly by penetration.

Ink drying is a considerable problem in letterpress printing. Modern methods include heat-set and moisture-set inks, but these are not yet widely used by book printers. If damp sheets are pressed against each other too early, some of the ink may pass from one surface to the other, or set off. This is not usually a serious risk except when half-tones or heavy solids are to be printed, and only then as a rule when both sides of the sheet are to be printed at the same run through the press. If a perfecting press, or perfector, which prints both sides of the sheet, one immediately after the other, is to be used, half-tones and heavy solids should as far as possible be kept to one side (which will be the second printing) of the sheet. The packing of the second cylinder of the perfector is kept oiled to resist the set-off from the printed sheet, but a heavy area of ink may overcome this resistance, set off on to the packing, and set off from the packing on to the next sheet. Perfectors cannot be relied on for rich inking from any printing-surface, and work of the highest quality is usually printed on single-cylinder presses.

There are various qualities of black ink of every kind; the use of cheap inks can spoil any kind of book with unpleasant tinges of blue or brown. Coloured ink may be either opaque or semi-transparent; and inks of any kind may be matt or glossy. Most printers prefer to match the reflective value of the ink to that of the paper, using for instance a glossy ink on a glossy paper, so that the reflective value of the page is even over the whole of its area.

The ink used in letterpress is thick and stiff, more or less of the consistency of treacle. On bookwork presses it is contained in a wide trough or duct at one end of the press; the duct is formed by the angle between an adjustable blade and a slowly rotating steel roller. The pressure of the blade against the roller along the whole length of the duct is adjustable, so that the pressman can adjust the amount of ink allowed to escape downwards between blade and roller and so round the circumference of the

roller. From the duct-roller the ink is transferred by a flexible communicating roller to the inking-slab of the press; this roller is brought into contact first with the duct-roller and then with the slab. The slab is rectangular and horizontal, and the ink, after reaching it, is distributed evenly over nearly the whole area of the slab by distributing rollers. From the slab the ink is collected by the inking rollers, and these transfer it to the printing-surface.

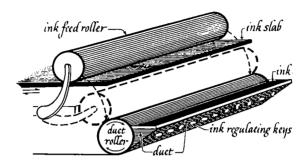


FIGURE 42. Ink duct.

A double-tone ink is sometimes used to enhance the appearance of half-tones. It contains two main ingredients; in addition to a component of the ordinary stiffness, there is a more liquid dye, which spreads farther and has a lighter colour. Each dot of the half-tone, therefore, is reproduced as a solid dot surrounded by a ring of a slightly lighter colour.

The point of interest to the designer in the inking system is that from beginning to end the ink travels more or less in a straight line parallel with the length of the press. If, for instance, the ink supply is more generous at one end of the duct than at the other, the ink supply will be more generous at the corresponding end of the forme. If certain parts of the printed sheet will require more ink than others, the typographer may be able to assist the pressman by arranging the heavier illustrations in a straight line along the forme, so that all can receive the heavier inking. This, however, is a refinement which is rarely possible. More often, designers arrange to have two or even more colours of ink supplied to the same forme at the same time. The duct can quite easily be divided, and one side filled with, say, red ink and the other with blue. A space of an inch or two on the slab between the two inks should be enough to keep them from mixing; the risk of mixing may be further reduced if the rollers are slit round their circumference between the two inks. By these means, if a book is to be printed in black and a tint, two pages in the same section and on the same side of the sheet can often be printed in different tints;

or two separate sections, although printed on the same sheet, may have four different tints between them—two on one side of the paper and two on the other. Further variations are, of course, possible.

The inking of small isolated points is always apt to be difficult, and connoisseurs of presswork are never satisfied until they have examined folios at the foot of the text page, and perhaps the words PRINTED IN GREAT BRITAIN, usually set in the small capitals of a small fount and alone on the page. The rollers, as they travel over the printing-surface, have no other support when they are touching such points, and tend to bear rather too heavily on them. For this reason, folios are likely to be better printed if they are aligned with the headline than if they are alone in the tail margin. If there is no headline to share the weight of the rollers with the folios, they may as well be in the tail as in the head margin.

When an octavo book is printed on a quad sheet, or a quarto or 16mo book on a double-quad sheet, the rollers run up and down the pages of the forme; otherwise, as for instance when an octavo book is printed on a double-quad sheet, the rollers run across the pages. Some printers consider that the best results are possible only when the rollers run up and down the main-strokes of the letters.

§138 ⋅ PLATEN PRESSES

A platen press is one in which both paper and forme are supported by flat surfaces when brought into contact. Evenness of pressure over the whole area of contact is possible only if both these surfaces are backed by a construction of great rigidity, which must increase with the area of contact, and the size of the platen press is therefore strictly limited. In bookwork the role of the platen is usually auxiliary only; it may deal with the jacket, with an oddment of 8 pages or less, or with some of the plates. Its forme capacity is usually not more than four large octavo pages at the most.

The handpress is, of course, a form of platen. The type is laid on a horizontal bed and inked by hand; the paper is laid on a flat tympan of flexible material such as vellum, held in place by a frisket, and folded down above the type; and the platen of the press is brought down by a simple hand-operated mechanism to force the paper into contact with the forme. This can be a leisurely process, with plenty of opportunity for care; inking can be extremely rich, and impression is usually heavy. Printing on a hand-press is not intrinsically better than on the machine, but it is certainly different. Fine (or, often, ostentatious) work such as that usually carried out by hand could often be done just as well or better by machine.

The two kinds of commercial platen with which most printers are equipped are the light platen and the art platen; they differ in construction and working, but are both simple in form. The book designer's concern is less with this kind of press than with the cylinder machines described in § 139.

§139 · CYLINDER PRESSES

The cylinder press is one in which the printing-surface is flat but the paper to be printed is wrapped round a cylinder which at the moment of impression turns in contact with the printing-surface. The area of the printing-surface in contact with the paper at any one moment is therefore wide but almost without depth—it is in fact a line rather than an area. This narrow strip of contact requires comparatively little total pressure, and the cylinder press can therefore be very much bigger in capacity than the platen.

A cylinder press which is not widely used for bookwork is the stop-cylinder flat-bed press, or Wharfedale, so called from the Yorkshire dale in which presses of this kind have been made for many years. The inking system is like that already described in § 137. The bed, containing the forme, moves to and fro under the impression cylinder. The paper passes down the feedboard to the under side of the cylinder, where it is gripped. The forme, having passed under the cylinder from the feed end towards the duct for the impression, has now to return for inking; as it does this the cylinder remains in such a position that its cut-away underside leaves room for the forme to return without contact. When the forme returns from under the feedboard, the cylinder turns, drawing the paper between cylinder and forme, before releasing it and completing its turn in order to grip another sheet. This kind of press is much used for the printing of jackets, illustrations, and other oddments, usually in small sizes such as double demy.

Most bookwork printing is carried out on the two-revolution press. This too is a flat-bed cylinder machine, with a bed that moves to and fro under a rotating cylinder, and an inking system as already described. Here, however, the cylinder turns twice for each impression, and continues turning as long as the press is running; the paper is fed to the top of the cylinder, and is drawn downwards to be printed as the forme returns from the far end of the press towards the feedboard. The paper reappears between feedboard and cylinder and is carried away by the delivery system; as the forme returns from under the feedboard the cylinder, still revolving, rises slightly to clear it.

The sheets of paper may be fed into the press either by hand or by an automatic feed. As each sheet advances towards the grippers, it is drawn

gently against adjustable stops or lays which place it in the correct relation to the forme. When it is released after printing, it passes into the delivery mechanism, which can if necessary slit it parallel with the length of the press, into two or three smaller sheets. The slit sheets are delivered into separate piles. Delivery sometimes entails the problem of set-off; the ink is still damp, and may tend to print a faint image from one sheet on to that which rests on it. Anti-set-off devices usually take the form of particles of solidifying materials sprayed over each sheet as it is delivered, to keep it separate from the next. If set-off is serious, interleaving may be necessary; a man lays a sheet of clean paper over each printed sheet as it is delivered. This is an expensive business, because of the reduction of speed and the extra labour and material needed; it is often necessary when double-tone ink is used.

The capacities of most two-revolution presses conform approximately to multiples of book formats in general use; the most common forms of press, as of book, are based on royal, demy, and crown. Oddments of 32 octavo pages or less, and small jobs, may be printed on a double-crown or double-demy press, which can print up to 16 crown octavo or demy octavo pages on each side of the sheet. Quad-crown or quad-demy presses are used for short runs in particular, since they do not take as long as double-quad presses to make ready; most printer's rates show that for runs of up to 3,000 or 4,000 the quad press is cheaper than anything bigger. The quad press prints up to 32 octavo pages on each side of the sheet.

The most economical press for much bookwork is the biggest, the double-quad press, usually eight-crown or rather larger. The run has to be long enough to be worth while, for with 64 octavo pages to print on each side of the sheet the pressman is still making ready his 33rd page when a quad press would have its 32 pages ready and printing. But once the press is running, it produces far more pages per hour at a rather lower cost per page than the quad press, just as the quad-crown machine has the advantage of the double-crown or single-crown.

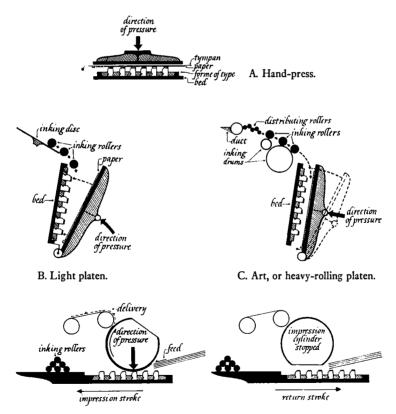
Some printers are equipped with presses of nondescript capacity, such as 45×56 , which is much squarer than any standard sheet, and other kinds of hybrid may be in use.

Nearly all two-revolution presses can print a sheet rather larger than the standard size by which it is known; one type of 'eight-crown' perfector, for instance, can take a sheet as big as $68\frac{1}{2} \times 45$. Another characteristic of the single-cylinder two-revolution press is the adjustable pitch-line. The pitch-line is drawn across the bed to show how far the printing-surface can extend without fouling the grippers which hold the sheet during printing. By an adjustment to the cylinder, however, the printing-surface can be extended an inch or two beyond this line; when this is done, one

set of inking rollers has usually to be taken out of use, since it cannot run back far enough to clear the edge of the printing-surface. This extra inch or two of capacity is therefore best not utilized if the forme is to contain half-tones or large solids which may require thorough inking.

Any attempt to tabulate the capacities of the various bookwork presses now in use in Britain would be idle; not only are several kinds of press made in this country, but many more kinds are built abroad and used here. They may be built to order, and one printer may adapt a press to a slightly larger capacity than usual. The typographer who wishes to make the best use of the various kinds of press must know to a fraction of an inch the sheet and printing-surface capacity of all the bookwork presses he is likely to use in book production, unless he is content to limit himself to subdivisions of crown or demy or one or two other standard formats.

The planning of demy or larger books for long runs needs particular care. Long runs are substantially cheaper on double-quad machines than



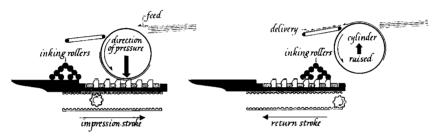
D. Wharfedale or stop-cylinder press.

FIGURE 43. Above and opposite, working principle of seven kinds of letterpress printing machine.

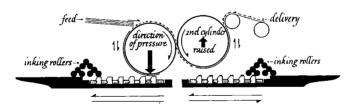
on quad, but few printers in Britain are equipped with a press which can print an eight-demy sheet, and probably none has an eight-demy perfector. One of the biggest flat-bed presses in use is the 5-0 Linotype Miehle Perfector, and its maximum sheet capacity is $45 \times 68\frac{1}{2}$. This means that for long runs $5\frac{1}{2} \times 8\frac{1}{4}$ (cut) will often be a more economical format than $5\frac{1}{2} \times 8\frac{1}{2}$, the conventional demy octavo. No pitch-line adjustment is possible on a perfector, which has only one maximum capacity.

§140 · PERFECTORS AND ROTARIES

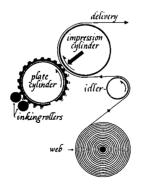
Perfectors are usually quad, double-quad, or intermediate in size. The sheet is printed first on one side in the usual way, then on leaving the first cylinder it is drawn round a second, which revolves almost in contact with the first and in the opposite direction. The second cylinder draws the sheet downwards to print as the second forme returns from under the



E. Miehle or two-revolution cylinder press.



F. Two-revolution perfecting press.



G. Web-fed rotary press.

feedboard; after printing the sheet is delivered in the usual way. The bed of the perfector is in effect a double-bed; it has two inking slabs, two ducts, two sets of distribution and inking rollers, and two formes.

There is rarely an advantage to the publisher in price in the use of a perfector rather than a single-cylinder press. Make-ready is a long business; the biggest machine prints 64 octavo pages from each of two formes, so that 128 pages or more may have to be made ready before printing can begin. Make-ready also includes the exact registering of the two formes together. Not all printers have enough perfectors to guarantee that one of them will be available for any particular book. In short, most printers charge the same rate per forme whether a perfector or a single-cylinder press is used.

Rich inking is difficult to maintain on perfectors, because the ink will tend to set off from the printed sheet on to the cylinder packing, and from the packing to the next sheet. Work which includes half-tones or large solids, or for which a high quality of presswork is essential, is usually printed on single-cylinder presses.

The most economical form of long-run letterpress printing is by rotary machines, similar in principle to those used for newspapers. No make-ready is possible, and really good presswork—and even a good standard of half-tone reproduction—cannot be expected. Equally discouraging, when paper is run through the machine in the continuous web—faster and cheaper than sheet-fed rotary—one dimension of the cut and delivered section is usually determined by the circumference of the cylinder; the other dimension, along the cylinder, is the only one where variations in size are possible.

§141 · LETTERPRESS DESIGN

In various ways the letterpress process needs more thorough planning by the designer than do the alternative printing methods described in the next chapter. It also differs from them in the appearance of the printed image and the cost of its reproduction.

In the first place, when type is used for printing, the forme requires careful design; the width and position of the chase-bars, for example, are among the complications. Any elaboration in make-up, such as that caused by marginal notes or illustrations, tends to be expensive and is usually avoided. In spite of the continual development of surface and recess processes, letterpress is still the best (because the most direct) method of text printing, as well as the least expensive for most new books. In the reproduction of illustrations, on the other hand, it tends to distort very fine lines, partly because of the difficulty of reproducing them in the form of a relief which is not only accurate in size, but strong enough to with-

stand pressure, and partly because of ink squash; nor is letterpress at its best with very large solids, owing to the difficulty of achieving and maintaining an exactly even printing pressure over the whole of any large area. In designing for other processes of printing, on the other hand, there is no need to plan the make-up of the forme in the same way; marginal notes, for instance, can be used without any substantial increase in cost. All these processes can reproduce large solids well, and most are particularly successful when fine lines are involved.

The letterpress impression, too, needs particularly careful planning. Type-faces and half-tone screens have to be matched precisely with the nature of the paper on which they are to be printed, and type has to be chosen to withstand the wear not only of printing but of any duplicating method that is to be used. Adjustments of the same kinds are necessary in designing for other processes, but there is no need for the same degree of precision in the designer's planning. The design of the letterpress forme affects the quality of the impression, since, for example, illustrations containing heavy solids are difficult to print with delicate type-faces.

As for cost, type, at the time of writing, remains the cheapest printing-surface in general use for reproducing the text of new books. As soon as the type has been imposed it can be printed by letterpress; but if it is to be printed by a photographic process, it must be printed by letterpress on transparencies or on reproduction sheets (after the cost of make-ready has been incurred), and the latter have to be photographed before the new printing-surface can be prepared from the negatives. Letterpress make-ready is substantially cheaper than photographic reproduction of this kind, but is substantially more expensive than the corresponding preparations in other processes. The advent of photo-composition will, of course, alter these relationships in price; alternative processes will be able to dispense with metal-cast type, reproduction proofs, and extra photographing, since the text will be set in the form of photographic transparencies. In the actual running of the printing-press, letterpress of good quality tends to be cheaper than other processes aiming at the same quality.

BOOKS

BURNS, R. – Printing inks – P T & P 9, 1947 – illustrations.

GANDERTON, VERNON S. – Cylinder presses – P T & P 7, 1946 – illustrations.

GANDERTON, VERNON S. – Proof and platen presses – P T & P 6, 1946 – illustrations.

IMPOSITION – Book impositions – British Federation of Master Printers, 1946 – pamphlet.

[Diagrams of various types of folding machine and of some appropriate impositions.]

METAL – Printing metals – Fry's Metal Foundries: revised edition, 1956 – illustrations.

RADFORD, R. G. – Letter press machine work (2 volumes) – Staples Press, 1950 – illustrations.

WINTER, ARTHUR F. – Stereotyping and electrotyping – Pitman, 1948 – illustrations.

See also, after chapter 5, WHETTON; and after chapter 9, STEER.

Surface and recess processes

In the letterpress or relief process the printing-surface differs from the non-printing surface in height. Surface, or planographic, processes are those in which the printing and the non-printing surfaces lie on the same level but are different in nature. More accurately, the same surface has printing and non-printing areas, or even areas which receive and transmit more or less ink. Recess, or intaglio, processes are those in which the printing-surface is recessed below the non-printing surface.

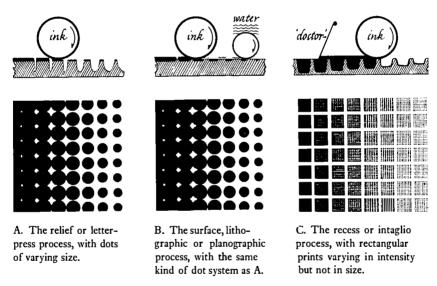


FIGURE 44. Principles of the three main methods of printing, with a comparison of the kinds of image by which they simulate continuous tone.

Several processes are of little or no value in industrial book production, being too costly in preparation, too slow in printing, too limited in endurance, or even all three at once, for impressions of more than a few score copies. The processes described in this chapter are those which are generally used by book printers, and a clear understanding of their principles

and potentialities will probably outweigh the most detailed understanding of other graphic techniques.

§142 · LITHOGRAPHIC PROCESSES

Lithography is based on the mutual antipathy of grease and water. If a damp roller is passed over a suitably grained surface, that surface will accept, and retain for a while, a thin film of moisture. If, while the surface is still damp, a roller covered with greasy ink is rolled over it, the water on the surface will repel the ink, and the surface will remain damp but clean. If the surface is allowed to dry, and a few greasy lines are drawn on it, when the damp roller is applied again the greasy lines will reject the moisture, though the clean parts of the surface will accept it as before. While the clean part of the surface is still damp, the ink roller can be passed over the whole surface again; this time, the greasy ink will be rejected as before by the damp parts of the surface, but will be received by the lines which are already greasy. A sheet of paper pressed against the whole surface will now receive a print of the drawn lines; the slight dampness received from the clean areas will cause no discoloration.

The first lithographic surface was the limestone from which the process takes its name. Stone is still in use, and is still the best of lithographic surfaces for the illustrator, but its usefulness is limited. The stone may be one with a coarse or a fine grain, to suit the style of the artist, and its surface is polished smooth. The picture to be printed is drawn in almost any manner; greasy ink can be applied by brush or pen or any other means to produce lines or flat washes, crayon drawing can be used to produce a delicate gradation of tone, and the drawn image can be adjusted by delicate scratching or scouring. The pores of the stone retain the ink, and if carefully inked the surface will deliver a good number of faithful impressions. Both preparation and printing require skill and meticulous care, so that printing from stone is used only to produce special results. Artists who are skilled lithographers, drawing on a number of stones, and preferably supervising the printing themselves, can produce colour prints of a quality which cannot be achieved by any other means. It is curious that the affinity of this medium to the illustrated limited edition has been so little exploited in Britain; the stone surface allows the artist to work as freely as on paper, and offers greater possibilities.

§143 · THE LITHOGRAPHIC PLATE

Limestone presents a good surface for the illustrator but is not a good material for the printer. It is expensive, heavy, fragile, and limited in size and in endurance, and it requires laborious preparation before each new image is put down on it. The usual lithographic surface today is provided by a thin sheet of aluminium or zinc. The metal is not, of course, porous, but when suitably grained its surface can retain an even film of damp until it evaporates. The graining is mechanically done by rolling a mass of balls of steel or marble to and fro on the surface with abrasive powder, and here again the grain can be fine or coarse. The surface is very much less versatile than that of stone, and is not particularly popular with artists; the metals are grey, so that drawing does not show up very well while the artist is at work.

A method of using the litho plate which is no longer common is for the artist to draw with a special crayon on a special paper, and to transfer his drawing to the plate by pressing the two together. It is in fact possible to print an image from a plate on to transfer paper and to transfer it to another plate. There tends to be some loss in quality in the course of making the transfer.

§144 · PHOTOLITHOGRAPHY

Usually the printing image is placed on the plate by photographic means, and the process is then known as photolithography. This, of course, greatly enhances the potentialities of the process, which can reproduce anything which can be photographed, including prints from type (figure 77, page 378). Negatives, whether line or half-tone, are prepared in much the same way as for making letterpress blocks. Adjustments to the completed litho plate are, however, so much more difficult than adjustments to the letterpress block that the tone-correction effected by working on the block has to be carried out in photolitho by working on the negative or positive. Dotetching, as it is called, is clearly more limited than the fine-etching used on letterpress blocks. The letterpress engraver etches the walls of the dot, since the surface is protected by enamel. The litho-plate maker, on the other hand, in etching the dot on a negative, attacks a flat or nearly flat dot, and tends to weaken all parts of the surface equally. A limited amount of dot-etching only is therefore possible, so that contrast cannot always be adequately reproduced by these means. This is the prime cause for the multiple workings often necessary in lithographic half-tone printing, whether monochrome or colour.

Tone correction by dot-etching can be supplemented by masking. There are various techniques of this kind; the principle of most is that an incompletely developed continuous-tone positive transparency is placed over the negative before the positive is made. This has the effect of modifying the light from those parts of the negative which should be corrected. The less opaque parts of the positive mask transmit enough light to darken

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the negative in areas which will correspond with the highlights of the image. Effectively carried out, this technique does not dull the sharp edges of a complex image as do the dot-reduction methods already described. Masking has as a rule to be combined with dot-reduction corrective methods, and is sometimes used for the reproduction of very fine line originals in which tones are simulated by delicate cross-hatching.

At the negative stage it is also possible to combine line with half-tone negatives, and to remove the background dot from the highlights of the image.

Once the negative has been made, a grained metallic plate is coated with a light-sensitive emulsion, and exposed through the negative. The coating over the printing-surface is hardened, that over the non-printing surface remains soluble. The unexposed emulsion is washed away, the hardened image reinforced; the clean metal is now ready to receive water and reject ink, the image to receive ink and reject water.

§145 · OFFSET LITHOGRAPHY

Direct lithography, in which the plate is brought directly into contact with the paper, is now rarely used, since it requires heavy pressure which soon begins to wear the image away. The process almost invariably used is offset lithography, in which the image is printed from the plate on to a smooth rubber blanket, and from the blanket on to the paper. The striking advantage of this process is that the flexible rubber can receive the printing image without more than the lightest pressure, and again without heavy

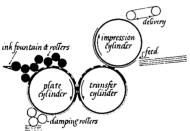


FIGURE 45. The principle of anoff set lithography press.

pressure can print it on to a surface of almost any kind; the rubber surface adjusts itself to any unevenness in the paper. Unlike letterpress, therefore, photolitho offset can print half-tones on rough paper and even on bookbinding cloth; and without the extra pressure necessary in letterpress can print large areas of flat colour. Screens used in photolithography are usually finer than those generally used in letterpress; 133 will do for any

reasonable surface, 150 is common, and when the subject and the paper deserve it, and the printing will allow it, 175 may be used. It is an immense advantage to this process that art paper is not necessary for half-tone printing.

A weakness of the ordinary offset plate is that the sharpness of the image is determined by the fineness of the grain, and too fine a grain leads to difficulties in damping. That the image is subject to wear has already been mentioned. These two faults, and the tenuity of the ink-film, can be overcome to some extent by the use of deep-etched plates. Deep-etching in lithography is different from deep-etching in letterpress blocks, and is not in fact deep-etching at all. A negative is made in the usual way, and converted by contact into a positive. The printing-down process is carried out, but now it is, of course, the non-printing surface which is protected by the light-hardened coating. The rest of the plate, which is to form the printing-surface, is etched very slightly, and the whole plate is then covered with water-resistant greasy ink. When the plate is soaked in water the light-hardened coating eventually softens and dissolves under the ink, leaving the non-printing surface bare and clean, and the printing surface very slightly etched and covered with ink. The plate is used for printing in the usual way. The effect of deep-etching is slightly to thicken the film of ink on the printing surface, and to make it more sharp and solid by flattening the grain of the plate in those areas on which it lies. The surface, or albumen, offset plate is now generally giving way to the deepetched plate.

One of the most notable drawbacks of lithographic processes is the high cost of photographing, retouching, and plate-making; another is the difficulty of correction. An ordinary offset plate can stand deletions and insertions (if a new plate cannot be afforded), but not twice in the same place; deep-etched plates are difficult to correct; but some multi-metallic plates can be corrected quite easily.

The life of an offset plate depends largely on circumstances. When surface plates are to be used, it is not unreasonable to expect some deterioration of the image after 25,000 impressions, if not before; deepetched plates may endure three or four times as long. The endurance of a multi-metallic plate (§ 147) is usually described in fractions of a million or even in millions.

Type reproduced by photolithography at its best is hardly distinguishable from that printed by letterpress. The differences are that lithographed type is not pressed into the paper but laid on it; the edges of the letter are sharp, but there is no ink-squash to make them blacker than the rest of the image or to thicken the image itself. Nor are the letters serrated, as they are by the cell-pattern in photogravure.

§146 · TRANSPARENT ORIGINALS

The image used for printing down does not have to be photographically made. It is possible to print or draw on a sheet of transparent material and to use that instead of a positive to reproduce type and pictures. The use of a grained transparent plastic for a drawing-surface has restored to the artist most of the directness and versatility he lost when industry ceased to use the lithographic stone. Deep-etched plates can even be printed down from originals on paper, if the paper can be rendered translucent enough by oiling; and music—which is normally composed by engraving on pewter plates—can be printed down to the plate from proofs pulled from the pewter on to transparent materials. Baryta paper, which to the eye appears to be opaque but which is transparent enough for use as a photographic positive transparency, is also useful, particularly for reproduction proofs.

Rightly used, the grained plastic sheet can be made to produce a variety of effects even more striking than those of which the stone is capable, since lines can be engraved on the smooth side of the sheet and can be filled with ink. What is more useful still, the sheet can be used for printing down any number of times in the same way as a photographic positive, so that there is no limit to the number of impressions, a distinct advantage over the lithographic stone.¹

The usefulness of the transparent original is at present limited. The drawing on grained plastic in itself is excellent, and so is the text printed on a thin transparency. Since, however, a surface suitable for drawing is unsatisfactory for proofing, the artist and compositor have to use different materials. These have to be mounted together before printing down, and both drawing and proofs are vulnerable. If they are to be used more than once, they have to be transferred photographically by contact to a film negative and thence to a film positive, in which form they are fit for permanent storage and repeated use. This naturally makes the process extremely expensive, and it is to be hoped that some cheaper and more direct method will soon be evolved.

§147 · MULTI-METALLIC PLATES

The problems of sharpness, density, and endurance have all been solved by the use of two or three metals for plate-making. One method of making bi-metallic plates is to build up a resinous reproduction of the printing

¹ As if these advantages were not enough, claims have been made that the process is autographic. An autographic image, however, is usually understood to be one that prints itself and does not require a duplicate for printing; chromolithography is an autographic process, but deepetched plates are made only by photographic means, even if no camera is used.

image by photographic means on a copper base. A chromium coating is then formed by electro-deposition on the base and round the resinous image. The resin is washed out and the plate is ready for printing. The hardness of the chromium and the fineness of its grain make possible the use of extremely fine screens, while the depth of the image contains a particularly rich film of ink. A plate of this kind is capable of an emphasis, contrast, and detail not easily achieved by other means; it has enormous endurance, and the smallest type can be printed as sharply as by letterpress. The clear, intensely black letters appear on the white background of a good-quality paper to stand up out of the page. Logically, this should lend itself to legibility better than the old-fashioned style of printing in which each letter is seen at the bottom of a dent in the paper. Platemaking, however, is extremely costly and is economically possible only when an immensely long run is planned.

§148 · COLLOTYPE

Although strictly limited in its usefulness, collotype is one of the most pleasing and interesting of printing processes. The printing surface is not metallic, and the process is capable of what seems to the eye to be continuous-tone reproduction. No screen is used; the printed tones appear to pass evenly from one shade to the next. The surface is broken only by a grain which may be almost imperceptible, and which does not interfere with reproduction of the finest detail. The printing image can be prepared only by photographic means.

The process is based, like lithography, on the antipathy of grease and water. That part of the surface which is to print the darkest colour is rendered the least absorbent to water; that which is to print the lightest, the most absorbent. The tones in between depend on the amount of water absorbed by the surface and the extent of its consequent rejection of greasy ink.

A light-sensitive emulsion of gelatine mixed with other materials is poured on to a sheet of plate glass and dried in a dark oven. In proportion to the strength of light to which it is exposed through the continuous-tone negative, the coating is hardened against permeation by water.

When the plate is about to be printed, it is soaked in a solution of glycerine and water. This penetrates the coating more thoroughly in those parts which have been protected against light by the darker tones of the negative, and permeates least the light-hardened parts. When the greasy ink is rolled over the plate, the drier areas accept more ink and the damper areas less. Even the darkest tones of the negative let through a little light, so that a slight background tint is normally printed over the whole area

of the picture. As in lithography, however, the darkest tones of the negative can be painted over so that there is no background tint. The collotype process is not well suited to a wide range of contrast. The darker tones on the plate cause the gelatine to swell slightly, and if this swelling is too pronounced, printing will become difficult. Tone correction is therefore less prolonged in collotype than in other processes.

Printing is an extremely delicate process; the temperature and humidity of the air in the pressroom must be controlled exactly, and the response of the plate to inking has to be constantly examined. Time spent in makeready is negligible, but the actual printing is slow and therefore expensive. Plate-making is less costly than the engraving of letterpress blocks, particularly when large areas are to be printed, but the life of a plate is extremely short—deterioration is usually to be expected after a few hundred impressions. Plates can be made harder for longer runs, but some loss of quality usually results; the grain becomes visible. The process is capable of the most accurate reproduction of detail but not of very sharp contrast or rich colour; the film of ink tends to be less opaque than that possible by offset printing from surface plates, and type is apt to look feeble in colour. There is a tendency to white spots on the picture, and these are disguised by touching up the printed sheet with a fine brush. Once the plate has been prepared for printing, alterations are impossible, though tones can be and are adjusted by local damping during printing.

A process which is not widely used in Britain is collography, in which celluloid instead of glass forms the foundation of the plate, making it flexible for use round a cylinder. The endurance of a collographic plate is many times as great as that of a collotype plate, and printing is faster and cheaper. Delicacy of tone and reproduction of detail, however, are rarely of the same quality as that usually possible with collotype.

Like offset, collotype prints well on surfaces other than art paper, and when the costs of letterpress are compared with those of collotype the difference in cost between coated and non-coated paper should be taken into account. Very few printers indeed are equipped for collotype printing.

§149 · GRAVURE

Recess printing processes are those in which the ink is contained in pits or lines engraved in a non-printing surface which is cleaned of ink before each impression. The only recess process in general industrial use for book production is rotary photogravure.

In this technique the printing image consists of a pattern of minute square cells etched into a cylindrical copper surface. Where a light tone is

to be printed, the cells are shallow and the film of ink thin; darker tones are printed from deeper cells which convey a thicker and more opaque film of ink to the paper. All the cells are of the same area though of differing depth. Where no tint is to be printed, the surface which touches the paper is smooth. The printing plate is a cylinder which revolves partly submerged in a trough of a thin spirit ink; as the printing area emerges from this trough, covered with ink, the non-printing area and the walls between the cells are wiped clean by a sharp edge known as the doctor-blade. Some machines have inking rollers which revolve in the trough

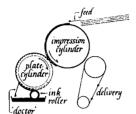


FIGURE 46. The principle of a sheet-fed rotary gravure press.

and transfer the ink to the cylinder. When the paper comes into contact with the printing area, there is no ink on the surface which touches the paper, but only in the cells. The use of an extremely thin and fluid ink is essential; only an ink of this kind can be scraped clean off the surface of the cylinder, penetrate to the full depth of the cells, leave those cells easily to print the paper surface, and evaporate quickly enough for delivery. The pattern of cells over the whole printing surface is essential to retain this ink; the walls between them are necessary to prevent the edge of the doctor-blade from removing the ink from the cells.

Like collotype, the process is a purely photographic one. A line or continuous-tone negative is prepared, and if it is the latter it is retouched to compensate for the flatness of tone inherent in most photographic processes. The high-lights can be brightened by using dye to increase the opacity of the negative locally, and opacity can be reduced to darken the deeper tones. The negative is used to produce by contact a continuous-tone positive, and this too is retouched.

The printing image, still in continuous tone, is next transferred photographically on to the light-sensitive gelatinous surface of a sheet of carbon tissue, which has already had a fine grid pattern of lines printed on to it from an engraved glass screen. The printing image now exists as a gelatinous film on the carbon tissue. Where the lighter tones are to be printed, the gelatine has been hardened against water by exposure to light; the darker tones, which were protected by the darker parts of the positive, remain comparatively unhardened and soluble. The whole surface is

covered by a grid of fine lines where the gelatine has been hardened into insolubility.

The carbon tissue is mounted on the copper with the gelatine next to the metal. The paper backing of the image is then soaked in warm water, which detaches it from the image, dissolves the unhardened parts of the gelatine, and reduces the thickness of the image in inverse proportion to the amount of light-hardening it has received. The gelatine coating over the cells which are to form the image has been exposed for a shorter time than that covering the lines between the cells, which received additional hardening during the screen exposure. The whole image now exists in relief on the copper surface, its thinness proportionate to the darkness with which it is to print; the thicker part of the gelatine covers the lines of the screen.

The non-printing surface is covered with acid-resist, and the whole area is etched. The thinner the hardened coating of gelatine, the earlier and therefore the deeper is the bite of the mordant; the screen lines are not penetrated at all. A limited amount of tone-correction can be carried out on the cylinder itself. Deepening the cells locally to increase the strength of darker tones is naturally easier than reducing the depth in the highlights. Combined with the main retouching on the negative, and subsidiary work on the positive, fine-etching on the cylinder enables tone-correction in gravure printing to equal that in letterpress.

§150 ⋅ GRAVURE SCREENS

Gravure screens are usually 150 or 175 to the inch, but for high-quality work a much finer gauge is used, and a screen as fine as 400 is possible. The screen pattern is, of course, even over the whole printed surface, but the cells vary in ink density. The ink tends to spread across the dividing cell-walls in the darker areas, so that the process begins to assume an appearance of continuous-tone. High-speed printing may also distort the regularity of the printed cells by flinging the ink towards a side or a corner of the cell (figure 78, page 380).

Good results may be obtained by using a rather coarser screen for tone illustrations, which need contrast, than for type, which needs sharpness. Since separate carbon tissues and separate etches are necessary, the already considerable expense is increased.

In another type of screen, not often used, the pattern of cells is arranged like bricks in a wall, and is rather less obtrusive than the simple rectangular pattern with its grid of straight lines. Screens with an irregular grain can also be used but are not often seen. As in letterpress printing, irregular screens are likely to improve the decorative effect but to reduce contrast.

A method of emphasizing contrast which is sometimes used for colour-gravure magazine and newspaper printing is that of invert half-tone. Instead of a continuous-tone positive, a half-tone screen positive is made, and this may be printed down photographically on to the cylinder. The smaller dots do not etch as deeply as the larger ones, so that the darker tones are printed from recesses which are larger as well as deeper than those in the highlights. The dots must not, however, be allowed to run together to any great extent, or the recessed area will become too wide to retain the thin ink, and the non-printing surface will not support the doctor-blade.

Art paper is not essential to fine-screen gravure, but the very best results are to be obtained from a matt art paper, although printing is difficult on account of the pressure used, which may remove the coating of the paper.

The best gravure printing has the merit of reproducing photographs with an accurate and emphatic contrast between dark tones and light, and also with the faithful reproduction of detail. Even the finest screens, however, tend to roughen the edges of printed letters with their pattern, which cannot be avoided. The initial cost of the process is extremely high, owing to the complexity of the work, but the endurance of the cylinder is substantially greater than that of even a deep-etched off set plate. Corrections are almost impossible once the copper has been etched, though insertions can be made on untreated parts of the surface.

§151 · SILK SCREEN

One stencil process is used in industrial printing, though never for the reproduction of text in bookwork. It is known as silk-screen printing, and is based on the squeezing of ink or paint through a silk screen. Before being processed the screen is rendered impermeable by a form of wax which fills its interstices. Preparation for printing, which can be done either manually or by photography, consists of removing this wax filling from the areas through which the image is to be printed.

Quite delicate line-work is possible, but only comparatively coarse half-tone screens can be used; at its finest, silk-screen can reproduce a bold 12-point type with reasonable fidelity. Its value lies in the thickness and (when necessary) the complete opacity of the ink or paint; there is no difficulty, for instance, in printing white on black. Its main use in book production is for printing jackets, but the process could also be used for book illustration.

Various processes mentioned in this and in preceding chapters are compared in figures 77 and 78, pages 377-380.

§152 · THE CHOICE OF PROCESS

The choice of a process depends mainly on the nature of the subject to be reproduced, on the amount to be spent on reproduction and printing, and on the number of copies to be printed. For the text of the great majority of books, letterpress is used; it is always the cheapest, and usually the most effective, method of reproducing type and line illustrations. It is also used for a good deal of half-tone work, and half-tones are sometimes deep-etched for printing with the text. Otherwise the whole book is printed on a coated paper, or the illustrations are printed separately as plates on art paper.

The most general uses of lithography in bookwork are for photographic reprints of books for which type is not available, for the printing of half-tones on uncoated paper, for the reproduction of particularly delicate line detail which might be thickened by letterpress, and for colour printing. The initial costs are often too high for runs of less than 20,000 and at present offset printing tends to cost more than letterpress. The process is used for both text and illustrations.

Collotype is used for continuous-tone reproduction in short runs where detail is to be faithfully rendered, and sometimes where elaborate make-up and large areas of illustration would greatly increase the cost of reproducing illustrations by letterpress. It is rarely used for the printing of specially drawn illustrations. Since it does not reproduce type well the underlines for illustrations are sometimes printed by offset or letterpress.

The high cost of photogravure plates is out of reach for most books, but there is no better technique for the reproduction of continuous-tone originals. Gravure should not be judged by the quality of magazines produced at great speeds on rotary presses; sheet-fed gravure is capable of admirable results. Any failure in retouching may, however, lead to excessive contrast and to a very unconvincing reproduction, and only gravure printers of good reputation should be invited to take part in bookwork. The process is not used for text printing of good quality.

BOOKS

BIEGELEISEN, J. I., and E. J. BERSENBARK - Silk screen printing process - McGraw-Hill, 2nd edition, 1941 - illustrations.

CARTWRIGHT, H. MILLS - Photogravure: a text-book on the machine and hand-printed processes - Hunter-Penrose, 1939. [For the hand process. The machine process is described in the next title below.]

CARTWRIGHT, H. M., and ROBERT MACKAY - Modern rotogravure - Southern Gravure Services Inc., U.S.A.

CUMMING, DAVID - Handbook of lithography - Black, 3rd edition, 1946 - illustrations.

GRIFFITS, T.E. - The technique of colour printing by lithography: a concise manual of drawn lithography - Faber and Faber, 1945 - illustrations.

WILLY, C. M. - Practical photo-lithography - Pitman: 4th edition, edited and revised by G. E. Messenger, 1952 - illustrations.

WILSON, THOMAS A. - The practice of collotype - Chapman and Hall, 1935. See also, after chapter 13, CLERC, CURWEN, and GAMBLE.

Colour

The colours of materials are discussed in chapters 18 and 19; this chapter deals only with colour-printing. Various meanings can be given to the term 'colour-printing', and most have in common a reference to two or more printings on the same side of the sheet, each printed colour being separately worked. Each working requires a separate printing-surface, and this multiplicity, essential to colour-printing, makes it too costly to be generously used in book production.

Any process which is used to print black can be used in colour-printing. Letterpress, the most widely used process for black printing in bookwork, does not overshadow the other processes to the same extent when colour is to be reproduced. The characteristics of each process, such as the high cost of gravure plates or cylinders and the tendency towards slight loss of contrast in offset, are accentuated by the successive workings of colour-printing. Different processes are sometimes combined; for instance, colours are sometimes printed by offset over a continuous-tone picture in black or grey reproduced by collotype.

§153 · THE CHOICE AND USE OF COLOUR

The choice of colour cannot be regulated by principles, because of the influence of fashion, which is continually changing. Choice is governed partly by taste and partly by what is possible. The range of colours which can be printed is extremely wide, since of course inks can be mixed to produce almost any colour. Very light shades, however, are only occasionally useful, because of their inadequate contrast with white paper, and because they are too pale to satisfy the eye in the comparatively small areas on which they appear; a tint which would be charming on the expanse of a wall may seem feeble in the few square inches of a page. Very dark colours tend to be too like black to be readily distinguished. In between such colours there lies a whole range of shades, many of which are rarely if ever used. The typographer may do well to collect examples of colours which please him and which are likely to be useful in colour-printing. The mixing of ink to make a precise match with a specimen is not easy, and an approximate match may often have to be accepted.

246 COLOUR

Any coloured ink can be reduced to a paler shade by the addition of a reducing agent, and attractive use can be made of different intensities of the same colour in one illustration. Many inks are transparent to some extent, but special opaque inks are also available.

The violet, blue, and green group of colours are usually spoken of as 'cold'; the yellow, orange, and red are described as 'warm'. The darker colours in the warm group, such as red, vermilion, and brown, have always been more popular in typography than the cold colours. Red is the traditional colour for the extra printing on a title-page, and in various shades is still more widely used than any other colour for that purpose.

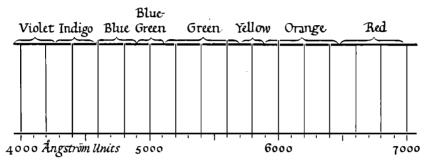


FIGURE 47. The spectrum of white light, showing the 'cold' colours on the left and the 'warm' on the right.

The shades of colours appear to vary according to the surrounding colours and to the colour of the surface on which they are printed. A cream or darker paper will give perceptibly darker tints from any ink than will an extremely white paper. The brightness of a colour may be weakened or emphasized by those of its neighbours; for instance, a patch of blue surrounded by a mass of such colours as dark grey and dark brown will appear to differ in shade from a patch of the same blue when surrounded by such colours as pink and yellow.

The extent of the area on which a colour is printed appears to affect its intensity. A few small spots of red, for instance, printed on white paper, will mingle with their background and take on a pink appearance; a large panel of the same colour will look perceptibly darker.

§154 · COLOUR IN TYPOGRAPHY

Whatever its purpose, colour is more likely to be successful when its use is planned from the beginning than when an arrangement or an illustration designed for black only has a colour introduced. This is true in particular of typographic colour-printing; a black title-page, for example, may be spoilt by the arbitrary addition of colour, which will alter the balance of the composition.

Legibility depends to some extent on the contrast in colour between type and its background. If the contrast is inadequate, as when a grey paper is used with black type, the letters cannot be seen clearly enough; if the contrast is too emphatic, as when the paper is extremely white, reading may become a strain. Legibility may also be impaired if areas of colour spread from an illustration into the text area; this may not only obscure the letters but may interrupt the rhythm of reading by differentiating one part of the text from the other.

Text is by tradition printed in black, but other colours may be equally legible; dark green is said to be particularly intense and therefore suitable for this purpose. There is not much evident need or demand for experiment here, but for special purposes and in comparatively brief passages a colour other than black may be more attractive and not less legible; just as a colour other than white may be used for text paper.

Colour can be used to carry out a function other than decoration. A common example of this is the rubric in church services, where the words printed in red are liturgical directions rather than part of the service to be spoken or sung, or are the priest's part of the service as distinct from that of the congregation. The use of two colours in the same line entails the risk that the slightest error in register will spoil the alignment of the two parts of the line. But if in drama, for instance, the name of the speaker is to be printed in colour but the speech in black, the risk of failure can be diminished by placing the name in a line by itself.

Colour used for decoration on a page otherwise printed in black should be placed with care because of its different emphasis. The habit of printing in red the first letters of displayed words has fortunately died out; it was bad not only because it divided the word into two differently coloured parts, but because it scattered spots of red in meaningless positions on the page. In the same way, if a chapter begins with a large initial flush with the left-hand margin, that initial, as an emphatic element of black or some other colour on the left of the page, tends to unbalance what otherwise may be a centred arrangement. Colour in typography is best used purposefully, to strike either a subtle or an emphatic note rather than any in between.

Colour is usually assumed to be more emphatic than black, but this is rather a matter of opinion. Bernard Newdigate, the master-printer of the Shakespeare Head Press, preferred to treat black as more emphatic than any other colour, and liked to print a title-page all in colour except for the title itself, which was in black.

Colour benefits from contrast with black. A display line such as the title of the book may, if printed in colour, look particularly well with a line of black type above it as well as below.

248 COLOUR

Type printed in a comparatively pale colour tends to look thinner than when printed in black or some other strong colour. Display lines to be printed in light colours may therefore look better if set in a comparatively bold type.

§155 · UNMIXED COLOUR

Unmixed colour is that which is not printed on the same part of the sheet as any other colour, as when, for instance, two colours appear in the same illustration and each colour is restricted to its own parts of the picture.

If more than one colour is used in addition to black, the two extra colours are likely to fall on adjacent areas. If they are planned to meet but not to overlap, a white line may appear between them unless the register is perfect. It is better to design the two colours to overlap very slightly. If they overlap more than a very little, the third colour they combine to produce may become conspicuous. Even if one of the colours is very dark and the other very light, they will produce in combination a more glossy surface than the dark colour alone, although the difference in tint caused in the dark colour by its coincidence with the light one may be negligible.

Unmixed colour can, of course, be printed in flat areas, in grained or stippled areas, in mechanical stipples, or in half-tone or continuous tone, in the same way as black, according to the process used.

§156 · COLOUR-MIXING

The mixture of any two colours produces a third colour. Provided that the printing inks are not altogether opaque, one colour printed over another does not entirely hide the first but combines with it. The simplest form of colour-mixing is that in which each of two colours is printed in solid areas, one overlapping the other. Black can, of course, be combined with a colour to produce darker shades.

The intensity of mixed colours and of the colour they produce together can be adjusted by the use of stipple or tone for one or more of the colours. Blue printed solidly over solid yellow, for instance, may produce a strong green; a mechanical stipple of blue printed over solid yellow, a yellow-green; stipples of blue and yellow together, light green.

This can be done very effectively by using line-blocks; an artist¹ has described his technique of colour line.

From the preliminary sketch a drawing in ink is made. . . . The engraver makes a line-block and sends me a number of proofs on a water-colour paper and at least four pulls in a light blue ink on a smooth cartridge paper. On the black prints of the water-colour paper I work out the colour treatment.

1 GORDON CULLEN: Colour line (Penrose annual, 1950).

It is evident that a separate drawing must be made for each colour and these are prepared on the blue proofs; solids are drawn in solid black. (Mechanical) tints are outlined and the kind of tint and its strength are specified....

If three colours are available, an extremely wide range of colours can be produced by mixing. If trichromatic inks (§§ 238–9) are used, most of the colours in the spectrum can be reproduced quite faithfully; the colours of these inks, however—yellow, blue-green (cyan), and magenta—are not in themselves particularly attractive. The difficulty lies not so much in the printing as in the planning of such work. The original for each working must be drawn separately as well as designed to combine with the originals for the other printings. The method relies on the artist's ability to analyse colours by eye and to foresee the result of combining prints from separate originals.

Elaborate and delicate colour-mixing tends to be uncertain in result. If, for instance, a very thin green line is to be reproduced in workings of yellow and blue, there is some risk that instead of one green line there will appear one blue and one yellow, side by side. Dimensional instability in the originals, in the process film or in the printed paper, and inaccuracies in printing, all endanger perfect register. The surest form of colour-mixing, therefore, is based on the use of areas of colour rather than details.

§157 · CONTINUOUS COLOUR

Continuous colour is a term used in this chapter to indicate colour so reproduced that many of the colours in the visible spectrum appear to merge with each other as do the tones in continuous tone. To reproduce all these colours by printing each separately would be hopelessly uneconomical; instead, a few colours are combined to reproduce all the rest. In order to achieve this, each of the colours must be printed by a method which simulates continuous tone.

The cost of preparing and printing from three or more printing surfaces is high, not only because of the multiplicity of processes, but because of the skilled handwork usually necessary to compensate for weaknesses inherent in the technique and for limitations in the colours of the inks. Methods of diminishing this handwork are coming into general use, but the cost is still considerable. Furthermore, any adjustment to one printing plate, in order to increase or reduce the intensity of the printed colour at any point, may necessitate adjustments to the others. Register, too, has to be maintained throughout all processes; it requires particularly careful make-ready and printing.

Because of the expense, then, continuous colour is of restricted use in bookwork. When it is to be used, however, it can be used to its best 250 COLOUR

advantage only by those who understand it; and this understanding may make possible striking economies within the high cost of the process.

Basically, the method of reproducing continuous colour in printing is to combine blue-red (magenta), blue-green (cyan), and yellow inks. The theory of colour analysis and synthesis is outlined in appendix D, where the technical terms used in this section are also explained.

The trichromatic process can reproduce only a limited range of colours. It cannot, for instance, do justice to any colour with a reflection range narrower than that of the inks used—that is, any particularly pure, bright colour. Since most colours are a mixture of radiations, difficulties of this kind are not often met, but they must always be expected. Clerc¹ quotes the violet-purple of such flowers as the cineraria as an example of a colour not capable of trichromatic reproduction.

Colour analysis by means of coloured filters is a reasonably accurate process; subtractive synthesis by printing is not. The successive printings partly conceal the earlier printings, and white paper appearing between the dots in half-tone printing may unbalance the synthesis. Worse still, the best available coloured inks are far from accurate in their reflection and absorption ranges. Yellow inks are not too bad in this way: magenta inks reflect too little red and far too little blue: and cyan inks are extremely poor, reflecting far too little blue and only a little green. The trichromatic process is therefore at its weakest when dealing with bright emerald green, violet, purple, and the more intense of the blues. In addition to the tone-correction already described in § 127, colour correction is necessary. Certain areas of the magenta printing, for instance, may have to be corrected to compensate for the inadequate reflection of the blue-violet shades in both the cyan and the magenta printings.

Trichromatic inks have been standardized,² so that if the printing-surface has to be made outside the printing-office, printer and engraver will be agreed on the precise specifications of the inks to be used. In order to compensate for their inability to reproduce certain pure and intense colours, however, the trichromatic inks may have to be adjusted in tone, and the printing-surface will have to be prepared with this in view. Alternatively, extra printings may be necessary, to reproduce a colour which does not lend itself to the trichromatic process.

Because of the inadequacy of their absorption ranges, the trichromatic colours do not combine to reproduce a satisfactory black. Any picture which is not uniformly light in tone is likely to need a fourth, intensifying printing in black or grey. The extra working affects the shades of the

¹ CLERC: Ilford manual of process engraving. See also GAMBLE on 'Defects due to printing inks' in his Modern illustration processes.

² B.S. 1480.

others; the reproduction must be planned for four workings—a fourth cannot be imposed on a three-colour reproduction at the last moment. This extra printing in a dark tone may be useful in disguising any harshness of reproduction caused by a wrong adjustment of the trichromatic colours to each other.

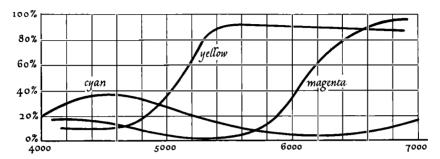


FIGURE 48. The reflection range of a set of trichromatic inks, showing a general weakness in cyan and an inadequate violet-blue reflection in magenta. Based on Clerc's figure 100.

The reproduction of a bright metallic surface is usually done by an imitative use of colour, with yellow to represent gold, grey and white for silver, and so on. Facsimile reproduction is possible by printing the metallic part of the image with an adhesive and by dusting on a metal powder (bronzing). The brightness and adhesion of the metal powder are not permanent, and the powdered surface is extremely vulnerable to set-off from anything printed on the facing page; a bronzed plate may have to be protected, perhaps by a loose or tipped-in leaf of tissue. Metallic inks can also be printed by ordinary processes.

§158 · STENCIL PROCESSES

Stencil processes, not particularly valuable for black printing, can give admirable results in colour. The simplest method is to cut a stencil and to brush colours by hand through it on to the flat sheets, and this is a comparatively cheap, but slow, method for short runs. The work can be done by unskilled labour, and the stencil itself need not be expensive. The best use of the method is to transfer to the paper pigments brighter and more opaque than those of printing inks; little is gained from the use of flat colours which might equally well be reproduced by printing. Stencils should not, of course, be planned for fine detail, which is best rendered in the printed part of the design.

By combining photographically prepared stencils with machine-printing, the silk-screen process can produce economical colour-prints with comparatively fine detail in limited runs; a few thousand impressions are 252 COLOUR

usually the maximum. Opacity and brightness are again the characteristics of the result, and type which contains no hair-lines can be reproduced. The process is rarely used for book illustration, and only sometimes for jackets and covers; it tends to be rather more expensive than ordinary printing techniques except for very short runs. The silk-screen stencil is not limited in design in the same way as an ordinary stencil, in which no aperture can completely surround a blank.

§159 · LETTERPRESS

Both line and half-tone methods are used in colour printing by letterpress. Autographic colour illustrations can be produced from wood-cuts or wood engravings, or from engravings combined with stencils. More often, zincos are used for colour line, and gradation of colour results from the use of hatching and stipples, whether manual or mechanical. Mechanical stipples can be combined with flat tints to give particularly attractive results from line-blocks. The advantage of colour line is that it is substantially cheaper than continuous colour (partly because of the high cost of half-tone retouching and make-ready), it can be printed on text paper, and there is no interpolation of half-tone screen and retoucher between original and reproduction.

Inks used with relief and surface processes normally consist primarily of a pigment suspended in a varnish base; they are limited both in transparency and in brightness by the nature of the varnish. Water-colour inks can, however, be printed from rubber stereos or cuts, and are particularly bright in colour and transparent.

Sets of half-tone blocks are used for the reproduction of continuous colour. Tone-correction and colour-correction are both carried out in fine-etching, which is a highly skilled and proportionately expensive process. 'A skilful fine etcher, given time, can make from three monochromatic plates a tolerable transcript of a drawing in colour—he needs no selection by means of colour filters.' The loss of sharpness which fine-etching causes in monochrome blocks appears in colour blocks as a lack of sharpness in both tone and colour, and the use of masking for the correction of colour as well as tone is essential to work of the highest quality.

Some colour correction can also be carried out in make-ready, when increased impression and resulting ink-squash can darken the colour locally.

If in a set of half-tone colour blocks, each were to be made with the screen at the same angle, the coincidence of dots after successive printings would form a pattern of light and dark tones which would interfere with

¹ Gamble.

the tonal values of the image. Each block is therefore made with the screen at a different angle. Even so, the dots form a visible mosaic pattern (figure 78, page 379), but since it is even in tone, it does not interfere with the tonal values of the picture. A set of letterpress blocks forms its continuous-tone image partly by superimposing the dots on each other to produce colours by combination, and partly by placing dots side by side to simulate colours; where highlights are to appear the white paper is allowed to show through, tinted by small dots only. This is also true of colour half-tone in offset printing.

Because of the effectiveness of the correction of tone and colour by fineetching and by discriminating make-ready, the three trichromatic colours, magenta, cyan, and yellow, are usually enough for originals containing no deep tones. For originals of a darker kind, a fourth printing in black or grey is necessary.

For the high quality of continuous-colour printing proper to bookwork, only a glossy white art paper is suitable. Any surface less smooth, hard, and even may distort the tones and colours by causing extra squash locally. Any paper colour other than white will darken the reproduction.

Continuous colour letterpress reproduction tends to be sharp and bright; in the sense that the most subtle effects of all are difficult to achieve—because highlights rely on the colour of the paper rather than on that of ink—it may appear to be rather hard. The darkest tones, on the other hand, may be effectively reproduced by the varnish-based pigments used with the process.

Plates for alternative processes are usually made by the printer, but the engraving of letterpress blocks is a separate trade, and a minority of printers are equipped for process engraving. Blocks for continuous colour must be ordered with great care if the engraver and printer do not work under the same roof, and sometimes even if they do. The blocks must be made for use with inks of which the reflection and transmission ranges can be matched precisely by the printer, and it is here that the British Standard set, whether three or four-colour, is valuable. If other inks are specified, their origin must be stated; it is not enough to provide a colour guide for the printer to follow. If duplicate plates are to be used for printing, they should be proofed on the correct paper before being accepted, since comparatively minor faults in duplicating can upset the balance of tones.

Whatever process is used, the cost of retouching depends on the nature of the original and the area of its reproduction. Retouching apart, however, the various processes differ radically in cost. The cost of letterpress blocks is related to their area. A set of blocks for one small reproduction may be quite cheap, compared with offset plates or gravure cylinders for

254 COLOUR

the same reproduction; a large number of blocks, on the other hand, might well be far more costly than plates or cylinders of corresponding total area. Letterpress printing in three or four colours tends to cost less than offset printing in the six or more colours that are often necessary, but if the run is a short one the high cost of letterpress make-ready may cancel this advantage, and some good four-colour offset work is now being produced. Art paper, nearly always essential for letterpress colour half-tone, usually costs more than the uncoated paper of equally high quality which can be used with the other processes.

§160 · LITHOGRAPHY

Lithographic stones are now rarely used. They do, however, offer to the artist a uniquely sympathetic surface for drawing, and designs for jackets and illustrations, whether monochrome or colour, are sometimes drawn on stones and transferred to offset plates for easier printing. Each colour is drawn on a separate stone, so that the artist must plan his colour-mixing and carry out the colour separation himself. Work drawn on a very finely grained stone can be effectively transferred only to a plate with a similar grain, so that plates cannot in fact retain the finest stone-drawn work. Autographic illustrations can also be drawn directly on to the offset plate.

Chromolithography is generally understood to mean the translation by a draughtsman of an artist's design into a lithographic printing surface. The illustration should be designed for a reasonably simple colour separation and a limited number of colours. The draughtsman can carry out not only colour separation but enlargement or reduction if necessary. Because of the interpolation of the draughtsman and the consequent indirectness of the process, chromolithography is usually confined to poster work.

Photolithography, like letterpress printing, is well suited to both line and tone colour subjects, and is particularly apt for line work which includes extremely fine detail. Also as in letterpress printing, continuous colour is reproduced in photolithography by means of the half-tone screen, with the screen placed at a different angle for each working; in the same way too, highlights are rendered by the exposure of paper, tinted with sparse dots, and dots of different colours are both superimposed and placed side by side.

Dot-etching is no more effective in colour-correction than in tone-correction, and extra printings are often necessary. A common method is to use trichromatic inks and black, with extra workings in tints of blue and magenta from specially made plates, to compensate for the inadequate reflection ranges in those colours. In letterpress, pressure forces the ink outwards to form a hard edge to the dot, and the smooth hard surface of

the paper gives the dot a mechanically even shape; the resulting print tends to be sharp and brilliant. The cartridge paper often used for offset colour printing, on the other hand, gives the dot a slightly irregular shape, and the lack of pressure spreads the ink evenly over the printed surface, so that the lithographic image has a pleasantly soft and subtle appearance.

§161 · COLLOTYPE

Collotype is an apparently continuous-tone process, and nothing is gained from using it to reproduce line originals, except in very small numbers, or unless they include extremely fine detail. Since it is not well suited to sharp-contrast negatives, colour correction, carried out on the continuous-tone negative, is far from easy. Printing too is difficult; great care is needed to maintain evenness of tone, and any variation may upset the colour balance. The succession of nearly continuous-tone workings produces colour by mixing only, and no dot-pattern appears; the reproduction of details can be sharper than in any other process. Colour collotype is extremely costly in printing, and can very rarely be used in books; its use is mostly restricted to the reproduction of paintings.

§162 · PHOTOGRAVURE

The main correction of tone and colour in photogravure is carried out on the continuous-tone negative, and may be supplemented with work on the positive and to a limited extent on the cylinder itself. This effective colour-correction, combined with the rich tones possible to a recess process, makes three workings adequate for almost any kind of original. With three workings, gravure can match the richness and contrast of letterpress in three or even four workings, as well as the subtlety and softness of six-colour offset, and can exceed both processes in density and clarity of colour. The transparent solvent-based inks produce clear, bright colours by subtractive synthesis only, since next to no white paper shows through the ink, and lighter tones are not broken up into isolated dots as in halftone. The thin cell-walls are not usually noticeable enough to form a pattern, and in any case are often covered by ink from the cells. The screen angle is often the same for all workings. Fine screens are used, normally 150 or 175 lines to the inch and occasionally up to 400 to the inch, so that the print may give the illusion of completely continuous tone. It is therefore one of the most attractive of all colour-printing processes, but it also tends to be one of the most expensive, because of the high cost of preparing the cylinders; only for very long runs will it be found economical.

256 COLOUR

§163 · ORIGINALS

The image received from a surface by the camera may be different from that received by the eye. Intensities, for instance, may be different; a blue which appears to be quite a strong colour may make very little impression on a negative unless a filter is used. This enables a line original to be marked in blue, to indicate the extent of mechanical stipples or for other purposes, without complicating reproduction. In the reproduction of continuous colour, the comparative intensities of colours recorded by the negative may be different from those seen by the eye, and care is necessary in the choice and use of artist's materials. For instance, no white paint other than process white should be used for any alteration of originals for continuous-tone reproduction, since the camera tends to see ordinary white paint as grey.

The value of restricting an artist to the use of paints of three colours is extremely doubtful, because of the difficulty he will find in obtaining the exact shades required by mixture. The result of the artist's labours might be that the picture would be very easy to reproduce but hardly inspired enough to be worth reproducing. Better results are likely if the artist is merely warned not to use particularly pure and vivid colours, not to paint in successive transparent layers, and not to rely on getting a facsimile result. The engraver or printer can then go ahead to do his best with a reasonably suitable original. It is to be hoped that one day there will be a full range of artist's colours suitable for reproduction in three and four colours.

Experienced artists can sometimes provide separated colour originals, which consist of a set of black drawings, one for each printed colour. This obviates filters and colour correction, and makes possible a cheaper reproduction, but may have its drawbacks. The character of the illustration is difficult to assess, so that authors and editors may be unwilling to approve it until they have seen a colour proof. Precise register in the original is essential; the artist must be careful to use dimensionally stable drawing surfaces, and to insert register marks (finely drawn crosses, above, below, and beside the picture) on the original for each colour. Colourmixing is far from easy to plan, so that the unpractised artist is likely to produce an uninspired colour scheme.

If the subject to be reproduced is anything other than a photograph, the best results are to be had from continuous-tone colour separation negatives taken direct from the subject. This is easy enough if a picture of some kind, or even a three-dimensional static object, is to be reproduced; each of the colour negatives can be exposed one after the other. If the subject is one which may move during exposure, or if the camera itself may be moved, a simultaneous exposure of all three negatives is essential.

The special cameras used for this purpose can produce fine work, but are far from easy to use.

The most commonly used form of photographic colour original is the colour transparency, in which all the colours to be reproduced are combined in a single original. Transparencies of this kind can be based on additive methods, with a fine mosaic of coloured filter elements each of which after exposure transmits one of the additive trichromatic colours; or on subtractive methods, with three dyed emulsions coated one over the other on one film. The mosaic type of transparency can be enlarged only to a limited extent, because enlargement may emphasize the mosaic itself. The mosaic pattern on a Dufaycolour film, for instance, is equivalent to the ruling of a 500-gauge screen. Such transparencies give the best results when reduced; if, on the other hand, enlargement is necessary, they can be enlarged to about double size without causing the enlarged mosaic pattern to become obvious, particularly if a screen of 133 or more lines is used. The three-emulsion or tri-pack film, on the other hand, can be enlarged up to about fifteen times its size without any evident loss of sharpness. Photographic colour prints may also be used, and are generally as satisfactory as transparencies.

Paintings and drawings not originally made for reproduction need care, and even care may not achieve a really satisfactory result; the difficulty with oil-paintings, for example, is usually to reproduce the relief of the brushwork. The process artist plans his work for reproduction, avoiding the weaknesses of whatever printing technique is to be used, and exploiting its possibilities, not only in colour but in the preparation of the picture and in the amount of detail he uses; the painter naturally disregards the limitations of printing processes.

There are various kinds of autographic colour print which may have to be reproduced, and each will have to be treated on its merits. The printer may often be able to follow the original colour separation; for instance, a lithograph in four colours may be reproduced by four-colour photolitho offset, using the same colours.

§164 · PROOFS AND PRINTING

One of the first problems in colour printing is the adjustment of register. The successive printings of a colour reproduction are adjusted to each other in position by means of register marks, which are either removed from the printing-surface before printing begins, or are printed on a part of the sheet that is to be cut away in binding. The maintenance of accurate register naturally depends on the dimensional stability of printing-surface and printed surface, and also of any material used to produce the printing-

258 COLOUR

surface. The use of electros and stereos, for instance, may make register difficult because of shrinkage both in moulding and in plate-making. Paper expands when it absorbs moisture, whether from the atmosphere or from a damp offset plate, and its stability is vital to success; a multi-colour offset press may therefore produce more accurate register than a succession of workings between which the paper has time to expand. It is extremely difficult to maintain accurate register, during successive workings, over the whole surface of a large sheet of paper, and the best results are obtained if colour-printing is planned in sheets of double, or at most quad, size, instead of the quad or double-quad usual in bookwork. The difficulty of colour offset printing in quad size for octavo books is that if the grain of the paper (§ 185) suits the printer it will not suit the binder.

Since each printing partly obscures its predecessors, the order in which the colours are printed has a visible effect on the result. At one time, the relative opacity of the inks determined the order in which they were to be printed, and since yellow was the most opaque of all it was always printed first. This is still the rule in some printing offices, but it is not necessarily the best method. To the eye the yellow ink is the palest, and the exact adjustment of its intensity when printed on white paper is extremely difficult. A common fault is to print too richly and heavily, in order to observe the contrast between tones, and this overloads the paper with ink and interferes with the intensity of subsequent workings. Coloured inks now available are transparent enough for the darker tones to be printed first if necessary. The yellow, printed later and therefore overlaid by fewer printings, will then add brightness to the print. The point is one for discussion with engraver and printer.

Colour proofs should always be pulled from the actual printing-surface and on the actual paper that will be used for printing. Any difference of tint, surface, or absorbency between the paper used for proofing and that used for printing may lead to discrepant results from the same inks and printing-surfaces.

The engraver or printer normally submits progressive colour proofs as soon as the printing-surfaces are ready. These consist of a print from each surface in its own colour, followed by combined printings in sequence. A possible order, for instance, would be:

grey
magenta
magenta on grey
yellow
yellow on magenta and grey
cyan
cyan on yellow, magenta, and grey.

With some processes (§§ 159-62) adjustments of colour can still be carried out at this stage. If, on comparison with the original, the final proofs are seen to need correction, the final combined proofs rather than proofs from individual blocks should be marked with alterations. Even if the correction on a single block appears to be simple, it may well affect the other blocks. The engraver is best left to go about his complicated task in his own way.

BOOKS

HARTRIDGE, H. - Colours and how we see them - Bell, 1949 - illustrations.

MARTIN, L. C., and WILLIAM GAMBLE - Colour and methods of colour reproduction - Blackie, 1923 - illustrations.

SPENCER, D. A. - Colour photography in practice - Pitman: 3rd edition, revised, 1952 - quarto: illustrations: bibliography.

Illustration

Book illustration has tasks for the typographer as well as for the artist. On the choice of an illustrator will depend the style of the illustrations and therefore something of the appearance of the book as a whole, so this choice may be considered a part of book design. Not all illustrators understand the techniques of graphic reproduction, and very few know how to exploit their possibilities; the typographer, offering technical guidance and suggestions, may be able to make good any technical deficiencies of the artist. Illustrations are no more than a part of any book, and are seen at their best when in pictorial style and in method of arrangement and reproduction they are in harmony with the other parts. The right use of any process of graphic reproduction is that which combines economy with exploitation of the possibilities of the technique. For these reasons the arrangement and reproduction of illustrations must be planned with no less care than the book's text and display.

§165 · THE ARTIST

The best book illustration is usually achieved only by those artists who combine creative enthusiasm and artistic ability with a complete and effortless mastery of the techniques of graphic reproduction. Achievement of this kind is rare except among autographic artists (§ 173), such as autolithographers and wood-engravers, who are accustomed to working on a printing-surface. A demand for autographic work exists outside the book trade, and encourages the right kind of artist to develop the right kind of skill in this work. A wider use of illustration, perhaps in the first editions of important books, would in the same way improve the general standard of book illustration.

The second-best in illustration should be within the reach of a competent artist or draughtsman who combines some new ideas with ability to exploit methods of printing reproduction. Of the limited number of able and versatile book illustrators in Britain, however, not all combine new ideas about style and *mise-en-page* with technical knowledge. Even the second-best, in fact, is not always within reach.

The blame cannot be laid on the illustrator; if it could, there would be little hope for improvement in book illustration. An artist makes the best use of his creative skill when his enthusiasm is aroused. If he is not interested in books, books must be made interesting to him. Sometimes it is for the typographer so to exert his own talent and skill that the artist becomes a book illustrator.

Versatility is a valuable quality in an illustrator, but the occasional need for a specialist must be recognized from the outset. A book which deals with a particular period or place, or with some special subject or circumstance, may need special knowledge which cannot be obtained merely from reading the book itself or from superficial study elsewhere.

Art, in its strictest sense, is usually understood to mean creative or interpretative work in which the artist's style is displayed in the service of the interpretation he has placed upon his subject. In all book illustration, other than the most plainly explanatory such as geometric diagrams, there is or should be some element of art. Both style and interpretation are matters which are better understood by study than by instinct alone. It follows then that some knowledge of pictorial art is needed by those who wish to assess the artistic value of book illustration, and this is particularly true at times when contemporary styles are difficult to interpret except after study. The typographer will therefore do well to study the pictorial art of the past and present, and to learn something about photography; he will then be the better able to appreciate the value of an illustrator's work, as well as to discuss plans with him, and, whenever necessary, to defend his work in the publishing house and represent his point of view. The commissioning of illustrators, a subtle task which offers both triumphs and disasters, may otherwise fall into unskilful hands, and book illustration will undergo a corresponding decline in quality.

The freedom permitted to an illustrator depends to some extent on the purpose of the illustrations. In preparing strictly explanatory illustrations, for instance, whose purpose is to make clear or to amplify a point in the text, or to provide a point additional to the text, the illustrator usually works under the guidance of author or editor, because text and illustrations are interdependent; the illustrator is not often free to choose his own subjects, and may even have to accept editorial suggestions about style and presentation. In planning illustrations without which the text would be complete, but which are intended to enlarge upon the author's meaning and to decorate his book, the illustrator may be allowed his own choice of subjects to some extent at least, and once having been entrusted with the work should certainly be allowed to work in his own style within technical possibilities. Where the illustrations are considered to be as important as, or more important than, the text, the illustrator needs a free hand within

reasonable limits. Whatever the purpose of the illustrations, the typographer will do well to know, before work begins, what the illustrator's intentions are

§166 · THE SUBJECT

The choice of subjects for illustration may be influenced by the particular talents of the illustrator, and will in turn exert some influence on the artist's handling of his task. The subject chosen should therefore lend itself to the treatment intended; its possibilities should be more evident to the illustrator than its difficulties. A common mistake in book illustration is to crowd too much detail into a limited area without emphasizing a focal point for the attention. The most successful pictures seem often to be composed of one, or at most two, salient points of interest, not necessarily large or in the foreground, the rest of the picture serving mainly to support and even to emphasize these points.

The proportions of the ordinary book-page are a constant trial to the illustrator. The tall, narrow shape lends itself in particular to a full-length portrait of a standing figure, but the illustrator is often expected to fit a whole panorama of scenes and figures into this shape; he would probably prefer for such a picture the wider and shallower area usual for landscapes. If an illustration is to occupy a full page, the typographer may do well, perhaps by means of a rough sketch, to make sure that the subject can be fitted into the available space.

The positions of the illustration pages in the book may be a factor in the choice of subject. If the pictures are printed with the text, the typographer may wish to space them out as far as possible, and to avoid, for instance, placing an illustration on the last page but one. If the illustrations require extra or separate printings, their positions may be strictly limited by folding and sewing techniques (§§ 190, 194); and double-spread illustrations which run continuously from one page to the next are usually best placed in the centre opening of a section. By whatever means the pictures are produced, they should invariably be as close as possible to the relevant text; widely separate text and illustration naturally confuse and exasperate the reader.

§167 · STYLE

The style in which any illustration is drawn, whatever the subject may be, is naturally governed by the purpose of the illustration. In a picture whose purpose is to explain, clarity and an accurate distribution of emphasis are more important than decorative effect, and ornamental devices such as mechanical stipples or a second colour tend to be used to enhance the clarity of the diagram rather than for decoration. The purposes of the

more common kind of illustration are to heighten the reader's enjoyment of the text, and to decorate the book. This is often successfully achieved by a deliberately decorative and sometimes rather formal treatment, as though the rigid pattern of the type page imposes its nature upon the pictures. It may be too that in preparing book illustrations an artist may be conscious that each picture is one of a set, and seeks a treatment that will do equally well for different subjects.

The possibilities of suggestion and allusion are perhaps less often exploited than they might be; the reader who has attended to the text already knows a good deal about the circumstances of the picture's subject, and much can be left to his imagination. The superficial view of a subject is not always the best; an oblique angle may reveal something pleasantly unexpected. An understanding of angles and lighting, such as the best photographers possess, has dramatic possibilities and may be valuable to the illustrator.

Whether the style of the illustrations is similar to or contrasted with that of the book's typography, there should be a planned relation between the two. The printer can do best with illustrations which in area and in thickness of line conform to the text. Heavy solids require richer inking than delicate types, and pictures which are lighter in colour than the text area may look anaemic. Given a suitable paper, however, a good printer can print dissimilar areas of text and illustration together without spoiling either.

Modern styles of pictorial art have not so far conspicuously influenced book illustration in Britain. Most book illustration is still limited to the naturalist convention, by which the picture does not represent anything far removed from images transmitted by the eye or the camera. The modern artist, on the other hand, whose style is now generally accepted by artists and amateurs of art, is not limited to visual reality; like a well-known advertisement, for instance, he may draw a man with two heads to indicate a quick look to left and right; he may choose to present as the largest figure in a group the most important instead of the nearest: he may display in one picture all four sides of an object, which could not in fact be seen from a single viewpoint but which could be seen one after the other. Clearly such freedom of method may have much to offer in certain kinds of book illustration, where the reader already knows what the picture is about, and lacks only the artist's interpretation of the scene.

§168 ⋅ SIZE AND SHAPE

The size and shape of the pictures should be adapted to the requirements of the subjects chosen. A succession of battle-scenes, for instance, may be

ANENCOUNTER

increasing anxiety and ready to interrupt the

Only now does be prevail, when the stranger, startled and astonished, sees the animal standing opposite to him in an, as he at first her responsibility would arise that I cannot assume. lieves, hostile pose. The next moment, to be sure, be knows that the dog, far from showing enmity or batred, is grieved and troubled. This clearly is expressed by the bashful gleam in his eye and by the twist of bis bead, and also ap-

parent in the way be carries the stone, which in And when some day you are sad and voice all its hardness and heaviness lies ther under your grief, shall I be able to help you? And you the morbidly retracted lips.

not repress a passing smile. You are right, my friend. Between us, it sball remain unuttered, that word which gave rise to so much misunderstanding.

And as if it were something breakable, the in order to detain the stranger no longer.

And indeed be walks on and in bis abstrac tion does not immediately notice that the dog, inconspicuous and faithful, accompanies bim, untbinkingly, as a dog follows its master. This

No, be says, no. Not so. Not after this. We should both forget what we have experienced today. What is customary dulls, and your nature inclines to submit itself to mine. Hence a You would not be aware that your whole trust is placed in me. You would over ate me and expect of me what I cannot fulfil. You would watch me and approve what is unworthy. If I pre pare a pleasure for you, do I then find one? are not to think it is I who let you perish. No, Suddenly the man comprehends, and becan-no, no. Go away, I beg you, go. t repress a passing smile. And the man almost broke into a run, and it

looked as though be were fleeing something. Only gradually did bis pace slacken till finally be was walking slower than before.

He wasthinking slowly, What else would dog cautiously puts the stone down to one side, bave been uttered today between us. And bow at the end one would have offered one's hand-

An indescribable longing stirs bim. He stops and turns back. But just bebind bim the patch of road curves off into the twilight, which has descended in the meantime, and there is no one to be seen.

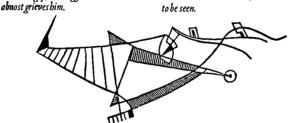
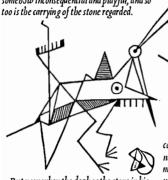


FIGURE 49. Unconventional book illustration. Two pages (not in their actual order) from an American private press book illustrated by Wightman Williams and designed by Harry Duncan and the artist. Format and margins are ordinary enough, and the use of a smaller attitude of pawing, stretching forward from the you are. You would have said, "Me," for there bigh-set, tense bind quarters. With great selfcommand be makes a few frivolous, childishly playful movements, as though to evoke the illusion that his forepaws hold something alive. And then without a word be takes into his mouth the stone that had this rôle to play.

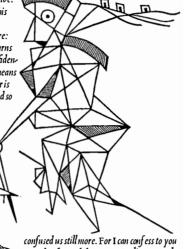
Now I am barmless and can say no more: that is shown by the nod with which be turns back. In this nod is something almost confidential, a kind of understanding that is by no means to be taken too seriously. The whole affair is somehow inconsequential and playful, and so



But now when the dog has the stone in his mouth, the man cannot forbear to speak.

We want to be reasonable, be says as be walks on, without bending down to the dog. Anyway, it can't be belped. What's the good of revealing ourselves to one another? Certain that there was no use keeping up the pretence recollections must not be allowed at all. For a

are no names between us. But, you see, that would have got us nowhere. It would only have



now that for a while I was quite discomposed myself. Now I am quieter. If I could only convince you how utterly it is the same for me. In my nature there are if possible still more ob-stacles to a renewed relationship. You would not believe bow bard it is for us.

As the stranger spoke thus, the dog perceived of superficial play. In a way be was glad, but at while I felt so too, and I almost asked you who the same time he seemed to be pervaded by an

size of roman capitals in italic text is a return to the Aldine style, but the lines are unjustified and the headlines are off-centre. The illustrations are extremely stylized but well suited to the type page. Set in Blado with Poliphilus capitals: reduced from 111 in. deep.

stretched across the upper part only of two facing pages; single figures will fit better into single upright pages. If typographer and illustrator can agree on the dimensions of the pictures before work begins, both the typography of the book and its illustrations are the more likely to be successful. A succession of unevenly sized chapter-head drawings, for instance, may cause the chapter-heads to be uneven in height on the page; originals of the wrong proportions may not fit comfortably on to the page. Small tail-piece illustrations are best not drawn until the whole book is in page proof; only then can the typographer be sure how much room remains at chapter-ends.

The best size for most illustrations is either that of the text area or substantially smaller. If text and illustrations have the same width and height they share the same margins, and their relation to each other is emphasized. Substantially smaller pictures, placed within the text area, will not give the impression that they were intended to be the same size. Alternatively, small pictures can be placed outside the text area, in the margins, which may have to be widened throughout the book to receive them: unless there is to be a great number of marginal illustrations, this may be a wasteful style. Illustrations slightly larger than the text but not nearly as large as the page may appear to have an indeterminate size. If an illustration runs into the sewn edge of the page, it may appear to be uncomfortably close to the text on the facing page. The apparent depth of the text area. with which the depth of the picture may be matched, is usually the distance from the top of the short letters in the top line to the bottom of the short letters in the bottom line; extenders, headlines, and page numbers appear to be outside the main area. Illustrations which are deeper than the text area may prevent any caption from appearing on the same page, and prevent page numbers on facing pages from aligning.

The value of bleeding is doubtful. The picture has no frame of white, and may seem to merge with the background which lies behind the book when it is held up to be read. The edges of the book are discoloured. The cost of blocks, paper, make-ready, and printing is increased. A part of the picture (not necessarily an essential part) is cut off prematurely instead of coming to a natural end. The advantage in size is inconsiderable. On the whole, large illustrations are to be preferred which stop short of the edge of the page; if minimum margins are used, the edges of the pictures will be reasonably safe against rebinding, and there should be no confusion between the area of the pictures and that of the text. A work of art not originally intended for reproduction should never bleed; the painter must be allowed to retain the whole of his composition, unless a small part only is to be reproduced. When pictures are marked to bleed, about \(\frac{1}{8} \) extra must be left at the bleeding edge of the picture after reduction.

Illustrations are sometimes planned to occupy the whole or part of two facing pages, and this gives the illustrator the extra width he may need. Double-spread illustrations of this kind are usually interrupted by the channel into which backing draws the centre of the opening; if there are to be many such illustrations, the book had better not be backed at all. The illustrator may, however, be able to compose his drawing in such a way that no lines or solids have to continue from one page to the other. If this is done, the illustration can be placed anywhere in the section, particularly if it does not rely on precise alignment between the two pages; two separate blocks may, of course, be necessary. If lines continue across the sewn edge, or if precise alignment is essential, double-spread illustrations should if possible be placed in the centre of the section.

Illustrations which are larger than the text page may be folded into a convenient size (§ 192). The size of illustrations is discussed here in relation to a page size and text area which have already been decided. If the illustrations are an important feature of the book, format and text area may have to be adjusted to accommodate them.

§169 · SCALE AND TRIM

The scale of an illustration may be defined as the ratio between its original size and its size in reproduction. Colour transparencies, which are usually very small, often have to be substantially enlarged, but reduction is far more generally used than enlargement.

Unless an artist draws different illustrations for one book expressly for different enlargements, the drawings of one artist should as far as possible be reduced or enlarged by the same amount throughout the book. Uneven scale will result in uneven thickness of line from page to page, and the illustrations will appear to be an unmatched set. Scale affects not only the over-all size of the picture but the strength of the detail. If the original is reproduced in half-size, most of the lines will be about half as thick, and in cross-hatching the white interstices will be half their original size, so that the hatched areas may appear rather darker than in the original. On the other hand, fine lines in the original may be too thin to reduce more than slightly, and since as a result they may not be reduced in the same proportion as others in the picture, their thickness in reproduction may affect the balance of emphasis. A really well-drawn original usually gains little or nothing from reduction; by drawing for reproduction in the same size, the artist retains more control over the result than by drawing for reduction.

Drastic reduction should as a rule be applied only to those illustrations which were drawn for it, or which in original are particularly big. It may,

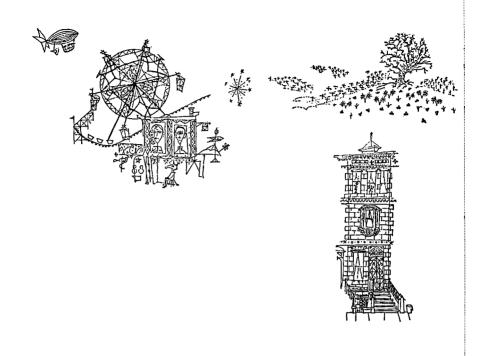
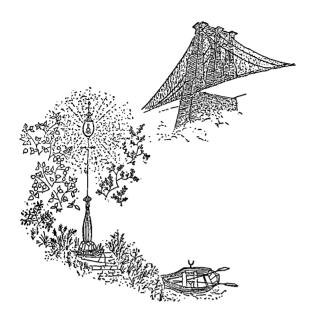


FIGURE 50. Another example of unconventional American book illustration, this time in a trade edition. The illustrations are by Marvin Bileck, who with Gerald Cross designed the



UMMER was the passage through. I remember first the long stone path next to a meadow in Prospect Park where as a child I ran off one summer twilight just in time to see the lamplighter go from lamp to lamp touching each gas mantle with the upraised end of a pole so that it suddenly flamed. On the other side of those lamps, the long meadow was stormy-green and dark; but along the

book. Set in Janson, with Weiss Initials series 1: reduced from 8 in. deep.

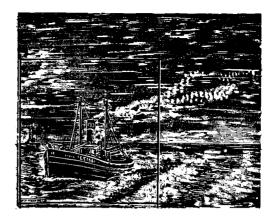
for instance, have a disastrous effect on a colour picture, since the colour values may be upset by reduction. When planning the reduction of a picture to be reproduced by half-tone the typographer will do well to visualize the effect on detail of first the reduction and then the screen. Most pictures which are fit for reproduction in their original size can be slightly enlarged, but enlargement to a size perhaps half as big again will accentuate the rough qualities of all but the sharpest and cleanest originals.

Reduction and enlargement are measured lineally, not by area; a picture marked for reduction to half size will be reduced to half its height and half its width. If a picture is marked $\frac{1}{3}$, the engraver will reduce it to one-third of its size, not by one-third.

Specially commissioned illustrations will, if correctly planned, be the right size and shape to fit the available space. Illustrations which are already in being are apt to need trimming of some kind to make them the right size and shape; this is particularly true of photographs. Not all photographic prints are perfectly rectangular; the engraver will produce a rectangular block from them without instruction, but the typographer may wish to adjust the edges in his own way. The subject of the photograph is not always square on the print; naturally, it is not always intended to be, but the typographer may have to square up an unintentionally tilted picture. To put right the slight tilt of the horizon or of some vertical feature like a flagpole is easy enough; when the angle of the camera causes vertical features to diverge or converge on the print, the typographer may have to choose one vertical (usually near the centre of the scene) which he intends to align with the sides of the picture (figure 51, left).

More often, a photograph is trimmed in order to adjust its proportions or to concentrate its subject. By trimming the top and bottom off a tall, narrow original, the typographer may be able to reproduce it in a wide shallow area. Often there is no need to reproduce the whole of a photograph; the unnecessary parts can be trimmed away from around the essential, so that the available area can be filled with what the reader needs to see, in the largest possible size (figure 51, above).

The scale and trim of any picture have usually to be planned together; the picture is trimmed to a shape from which it can be reduced or enlarged to fit the available space. If the available space is known, the proportions to be imposed on the original are also known; the problem is to find the dimensions to which the original must be trimmed. The simplest method of calculating these, if the problem is met often enough to justify some expense, is to make or buy a transparent rectangular frame of adjustable size, with a diagonal arm fixed to one corner. This can be placed over the original to show the effect of squaring up the picture if necessary and of any proposed reduction. The advantage of such an instrument is that it is



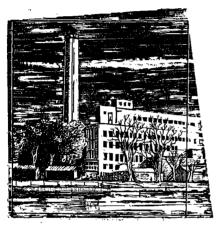


FIGURE 51. Above: if the inessential part of a picture can be trimmed away before reproduction, the essential part can be printed in a larger size than would otherwise be possible.

Left: a picture which is not rectangular and in which the subject is unintentionally tilted should be trimmed to a rectangle in such a way that the subject is straight. The chimney-stack provides a vertical datum line.

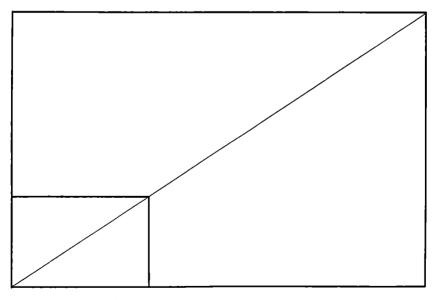


FIGURE 52. The reduction of a rectangular illustration along the diagonal.

used on the original, and scale and trim are settled in direct reference to the original, instead of calculated arithmetically and then imposed on the picture. The principle, of course, is that any two rectangles whose diagonals form the same pair of angles to the adjacent sides are similar in proportions, and the calculation can be carried out diagrammatically or by means of a slide-rule or similar instrument (figure 52).

§170 · POSITION

The position of an illustration on the page often settles itself; for instance a picture whose area is that of the text on the page is usually placed in the same position as the text. The placing of smaller pictures, on the other hand, may be a problem, since they may have to be fitted into text which appears on the same page.

Every picture is improved by a frame of white space, even a narrow one; if illustrations are placed in the text, for instance, they may benefit from a white line above and below, and perhaps a pica to separate them from any text at either side. If an illustration appears within the text area with text beside it, the text measure naturally has to be narrowed to accommodate it; this tends to interfere with the rhythm of reading and may cause difficulties in composition. Any illustration which has a clearly defined horizontal edge at top and bottom appears to be well placed in the text if the top edge aligns with the top of the short letters in the neighbouring line and the bottom edge aligns with the base of the neighbouring short letters. Pictures should never be allowed to interfere with legibility, whether by dividing a line of text into two parts, or by encroaching on the type itself.

When an illustration appears with text above and below, the reader may well prefer the illustration to occur between two paragraphs, where there is a natural pause, rather than in mid-sentence. This may seem a little untidy if the picture has straight horizontal edges, as photographs normally have; such pictures appear to be more neatly placed between two full-measure lines. In placing an illustration within the text area, as in placing the text area on the page, a position above the centre—the optical centre—may be preferable to the centre itself. A picture placed at the top or bottom of a page causes no extra break in the text.

If illustrations are placed back to back on the same leaf, there is some risk that each will show through the paper to confuse the other, and that when the printed sheets reach the delivery board of the press one illustration, lying face to face with the other on the preceding sheet, will set off on it. There is a particular danger of set-off if dark half-tones or large solids are placed back to back on a sheet which is to be printed on a perfector. Set-off is a constant danger with collotype, gravure, and bronzed

illustrations, in particular, and these are often guarded with a loose or sewn-in leaf of tissue-paper. This is an unattractive feature of any book, and most typographers prefer to allow ample time for drying.

When a picture cannot be fitted into the upright proportions of the page, it may have to be turned on its side. This inconvenient treatment should be avoided whenever possible, particularly if the book is to be large or heavy. By custom, a single full-page illustration in an opening appears on the recto, and turned illustrations have their feet to the right. If this custom is followed, the book will need to be moved in one direction only for all turned illustrations, and the reader will never be separated from the illustration by a page of text. If both pages of an opening contain illustrations, to place the illustrations on both pages the same way up will enable the reader to see both without extra movement; certainly all the illustrations on one page should be the same way up, to avoid confusion.

The successful grouping of a number of illustrations on one page or opening is mainly a matter of alignment (figure 80, page 382). A collection of small pictures of different sizes is bound to look haphazard; to look neat and purposeful they need to be aligned at as many edges as possible with the text and with each other. This will entail making them conform with each other to some extent in depth or width or both, and either singly or in sum conform in width or depth with the text area or with the over-all area allotted to illustrations throughout the book. Any disparity of the outer margins of the page is more obvious than a disparity at the inner margin or within groups of illustrations on the page; unevenness of size is therefore best concealed by aligning all illustrations as far as possible at the outer margins. Underlines may be used to contribute to alignments of this kind, being placed, for example, at the foot of the page even though the illustration above occupies only part of the space between head margin and underline.

The recto page is traditionally treated as more important than the verso, and is used for the commencement of most of the preliminary items of the book; in the same way, the recto is by custom preferred to the verso for illustrations. Conventions apart, there is little or nothing to choose between recto and verso.

The position of illustrations in the book, when they require extra or separate printings, depends on the imposition used and on the binding methods; these are discussed in §§ 135 and 192.

§171 · NUMBERING

Illustrations in the text are known as figures, and are often numbered serially without reference to the page on which they appear. The reason

for this is that when the text is being composed the keyboard operator cannot tell on what page any picture will appear. If the figures are numbered serially, textual references to them can be composed with the rest of the text; otherwise, references will have to be inserted afterwards by hand. Serial numbering, although economical in composing, tends to be inconvenient to the reader, since he cannot tell from the number of the figure on what page it appears. (This difficulty is met only when figures are infrequent and far from references, and it can be mitigated by a list of figures with page numbers in the prelims.) No other arrangement, however, may be possible if textual references to figures are copious, because of the high cost of inserting references by hand. If, on the other hand, there is only one reference to a figure's number on every few pages, figures may be denoted by page numbers, inserted in the text after the book has been made up into pages. When two or more illustrations appear on a page, they can be differentiated by the addition of a letter to the page number.

Plates are usually numbered in a style different from that of pages and figures; lower-case roman numerals are often used for prelims, arabic for pages and figures, roman capital numerals for monochrome plates (one number for each page, however many illustrations appear on it), and roman capital letters for any colour plates. This is because the positions of the plates in the book, and therefore the figures and pages between which each appears, are not known until the book is paged, and may have to be changed at the last moment. Roman numerals, however, are no longer familiar enough to be convenient, and a system of arabic figures may be preferred; plates are also sometimes indicated as 'facing page -'. A simpler method still, which may be possible when the number of textual references to illustration numbers is limited, is to add a letter to the number of the preceding text page. If, for instance, a diagram appears on text page 160, it may be numbered 160a; two illustrations on a plate facing that page may be 160b and 160c; and an illustration on the back of the same plate 160d.

Page numbers are usually omitted from pages full of illustration, in order to avoid distracting or confusing the reader, and for the same reasons headlines do not usually appear immediately above illustrations.

§172 · UNDERLINES

The typography of underlines is influenced by their length and the space available for them. Underlines of not more than a few words are often set in roman or italic capitals, small capitals, or both; italic upper and lowercase is well suited to underlines which are brief or of medium length; and

long captions are usually more legible in roman upper and lower-case. If underlines are set in a measure which contains too many ens, or if there is not enough interlinear space, they will be uncomfortable to read; for instance, small type should not be set in the text measure without leading, and underlines may well be set in two columns within the text measure; any which consist only of two or three lines can be centred. If roman upper and lower-case is used, it may be indistinguishable from the text setting unless it is at least two sizes smaller.

Illustrators who are also calligraphers sometimes incorporate a handwritten caption in the illustration, and this treatment avoids the contrast in rigidity of form between a freely drawn picture and a type-set underline.

Illustrations are sometimes spoilt by the inclusion of the artist's name. The illustrator should be offered a fair acknowledgement in the prelims and dissuaded from writing his name on his pictures.

Underlines which are placed very close to the picture tend to have an unpleasantly crowded appearance, and may distract the eye from the picture. If type has to be set close up to half-tones, the blocks will have to be made without a flange on the caption side.

The most convenient position for any caption is one close enough to the appropriate picture for the reader to associate picture and caption at a glance. Where only one picture appears on a page, the underline may be placed some distance from it, since there is no risk of confusion. When several illustrations are printed on one page, the captions are sometimes grouped together, perhaps keyed to the pictures not by position but by reference numbers. This makes a neat page, but may be inconvenient for the reader. When an underline appears between two illustrations, one above and one below, the space between the lower picture and the underline is often increased in order to emphasize the association between the upper illustration and its underline. Whatever the position of underline in relation to picture, it should as far as possible be consistent throughout the book; this will make association of underline and picture easier, and will give the placing of the underlines an appearance of purpose.

The underlines of a turned picture should, of course, be turned with the picture, so that both can be considered at the same time.

The underline for a picture which occupies the whole, or nearly the whole, of a page usually has to be placed on the opposite page. The neatest treatment is to place the underline within the text area, possibly separating it from the text and any footnotes by a rule, and using the text measure. This may involve difficulties in the make-up of the book, and more often the underline is placed outside the text area near the tail of the page, ranged inwards towards the illustration—an untidy treatment, but convenient for printer and reader.

§173 · AUTOGRAPHIC ILLUSTRATION

An autographic picture is one which prints itself; the picture drawn or cut by the artist forms the printing-surface. Autographic reproduction has an advantage over other methods in its fidelity to the intention of the artist, and in the distinctive character caused by the nature of the tools and surface of the medium. No process camera is used, but the care and skill and the special materials necessary in such work tend to make it more expensive than ordinary drawing for reproduction. The weakness of most autographic methods is the short life of the printing-surface and therefore the limited usefulness of the original; any material hard enough to withstand a long run is likely to be too hard for the artist to work on with ease.

Autolithography is one of the most attractive of all methods of illustration, because of the range and subtlety of the textures the lithographic stone can reproduce. It is an ideal process for limited editions, but is much less often used in Britain for this purpose than is wood-engraving.

The differences between woodcuts and wood-engravings tend to be unduly emphasized. Woodcuts are carried out on the plank side of a comparatively soft wood, wood-engravings on the end-grain of a harder wood. Both woodcuts and wood-engravings are capable of fine detail, and either can be used in the 'white line' style, in which the design is carried out in white lines incised into the surface instead of in black lines left in relief when the rest of the surface has been cut away. The black line method has now been superseded by photomechanical line reproduction, and it is the white line style, in which the picture is formed by the graver instead of the pen, that is generally used and preferred.

Woodcuts and wood-engravings can be electrotyped and so used for large editions; this practice has been described as fraudulent, but the purpose of the medium is the character of the picture rather than the use of wood in printing, and electros are capable of almost complete accuracy in duplication.

Metal engraving in relief is rarely used in Britain, but can produce attractive results, particularly in colour. Slabs of printing metal can be supplied by any printer, and a multiple graver can be used to score tones in the hard surface. The endurance of the material is greater than that of wood, but owing to its hardness the illustrator cannot be expected to produce on it detail as delicate as on wood.

Cuts in lino and rubber are incapable of any fine detail, but both surfaces have an affinity for ink and enough flexibility for rough paper; they are often used for printing large areas of colour. Water-colour ink can be used with rubber.

Intaglio (incised) engravings and etchings can be transferred to offset

plates for printing, and although in reproduction by any means they lose some of their character, they can still be made to produce pleasantly unusual illustrations. Autographic processes can, of course, be combined; lino-cuts, for instance, may be used to print colours in combination with wood-engravings in black.

§174 · PHOTOMECHANICAL ILLUSTRATION

Photomechanical illustrations are those whose printing-surfaces are prepared by the effect of light on chemicals sensitive to light, whether or not a process camera is used. Drawing for photomechanical reproduction is very much easier than working on an autographic surface, and a considerable variety of result is possible. Camera reduction can be used to disguise any lack of finish in drawing, and can be made to translate an ordinary picture into one of minute delicacy. It is disappointing that these advantages do not stimulate artists to a diversity of style which would take the place of the individual character of autographic work. The purpose of photomechanical reproduction is to produce an enduring printing-surface, which is its chief advantage over autographic methods; the original too can be used any number of times.

For specially commissioned illustration of the best kind, however, autographic methods are usually preferred, because the illustrator has more control over the quality of the reproduction. Not all photomechanical techniques require the use of a process camera, and those that do not can come near to autographic methods in fidelity to the original; in those methods for which a camera is used, some of the quality of the artist's work is usually lost. This is particularly true of processes in which a halftone screen is used, since the screen breaks down the image into a pattern of dots not regulated by the artist.

For the typographer's purposes, all originals can be divided into two groups—those which are prepared specially for the edition in hand, whether autographic or photomechanical, and those which are not. The treatment of the two groups differs. When dealing with the former, the typographer can usually choose in advance the appropriate technical methods, sizes and reduction, and can have originals designed to suit those methods. When dealing with the latter he must as a rule choose his methods to suit originals which are already in being, and he may have to adapt the originals to fit the space available.

§175 · LINE ILLUSTRATION

Line illustrations are those which can be reproduced (usually by letterpress or offset) without using a half-tone screen or a continuous-tone process such as collotype or gravure. Line illustrations are substantially cheaper to reproduce than tone. The resources of line methods are nearly always adequate to the purpose of specially commissioned drawings, particularly if illustrator and typographer are familiar with the possibilities within reach. Line illustrations can often be printed by the same process and on the same paper as the text, and have a natural affinity with type, which is itself a form of line reproduction.

Offset is often preferable to letterpress for line reproduction. The relief block is limited in the fineness of line it can reproduce; and a line original containing close cross-hatching may after reduction be as difficult to print by letterpress on uncoated paper as a half-tone. By its nature, printing from a relief surface tends to thicken the image because the pressure used in printing forces the ink outwards from the printing surface. Offset also tends to have the advantage of letterpress in the reproduction of large solids, particularly if the paper is not smooth.

Line originals are usually drawn by pen or brush with ink or black paint. Whatever the tool and material, all parts of the drawing should be densely black, and lines which are not intentionally blurred or unevenly drawn for the sake of effect should be sharp and clean at the edge. Any line which dwindles to the thickness of a thread may disappear in reproduction. If crayon is used, every mark on the paper should be black, however small it may be. Deletions can be made by over-painting with process white; if a waterproof black ink is used, there is no danger that black and white will run together.

If the lines and solids of the drawing are to have sharp clean edges, a smooth hard paper such as Bristol board is best. A rougher paper may be used to give a grained finish to the drawing, but fine lines may then be difficult to draw, unless a brush is used. A variety of textures can be combined if the original is drawn on thin paper laid on different backing surfaces during work on different parts of the picture.

A popular form of line original is prepared on scraper-board, the surface of which can be scraped away. The surface may be black and the picture formed by scraping it to reveal the white material below; or the surface may be white and the original drawn in black in the usual way and its texture varied with a scraping tool. The two techniques can be combined, and there are special scraper-boards which on being scraped expose a grained surface. Scraper-board illustration is sometimes condemned as imitation wood-engraving, and imitations of this kind are of course possible; rightly used, however, scraper-board can impart an individual quality to a picture, and may present a sharpness of edge difficult to achieve on other drawing surfaces.

¹ Figures 51 (§ 169) and 57 (§ 183) are examples of this medium.

There is a number of methods of simulating tone in a line drawing; mechanical stipples and the use of rough paper with crayon have already been mentioned. So long as every mark on the original is black, the marks may be as small or thin as the reduction will allow; shading, cross-hatching, and dotting are the most commonly used styles, and tones can be built up with patterns in the manner of Beardsley. A dry or 'starved' brush, and paint spattered on to the paper, are also used occasionally.

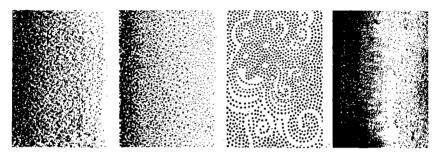


FIGURE 53. From left to right, crayon on rough paper, dotted stipple, decorative stipple, and starved brush with spatter, to simulate tone with a line process.

Greater directness of reproduction than in camera methods, and some economy, can be obtained by one of various photomechanical short cuts. Instead of preparing a drawing for photography, the artist may prepare a positive or negative transparency which is used to print down to a line-block or offset plate. The advantage of this technique in the making of line-blocks is not striking, since the nature of the original cannot deviate far from that of a line original for photographing, and it is in etching rather than in photography that most of the cost of process-engraving lies. Drawing on a grained transparent plastic which is used as a positive for printing down a deep-etched offset plate, a technique discussed in § 146, has much greater possibilities, producing grains and lines too delicate for the camera or the line-block, limited only by the grain of the offset plate.

Reversing from black to white is hardly ever used in book illustration. Illustrations may, however, be drawn for printing in white on a background of black or colour; the 'white-line' style is familiar, although it is usually restricted to wood-engraving. Illustrations are sometimes drawn in black lines but with a black or tint background instead of white.

§176 · TONE ILLUSTRATION

Tone illustrations are those which can be reproduced only in half-tone or by a continuous-tone process. Collotype and gravure tend to give better results than half-tone by offset or letterpress, but since the former are the more expensive, it is the latter which are more often used. The peculiar difficulty of letterpress half-tone is the need for art paper for reproduction of the best kind; that of offset, the tendency to weakness in the process (in its present stage of development in Britain) when reproducing a full range of tones between black and white.

The dot pattern of any screen less fine than 150 may be found obtrusive and may absorb detail; screens finer than 150 need the utmost skill in printing and (for letterpress) art paper of the best quality. Control over the local intensity of colour by retoucher and pressman may intervene between the original and its reproduction. For these reasons, tone methods are usually reserved for originals already in being which can be reproduced by no other means.

If an artist insists on working in pencil or wash or some other continuous-tone medium, an irregular-grain screen (§ 126) may be useful, whatever the process, to give the reproduction a less mechanical appearance. The background can be stopped out locally, so that the dot pattern or background tint does not cover the whole of the surface of the illustration.

Not all photographic prints are perfect for tone reproduction; those printed on an embossed paper, for instance, cannot be expected to reproduce well. Matt prints on grained paper, and sepia prints, are not much better. The best originals are purple or black prints on glossy paper; definition should be sharp, and a good range of contrast is better than a uniform darkness or pallor.

All half-tone originals need more care than line originals, mainly because defects in the original, however slight, appear in the printing-surface and cannot easily be deleted from it. Particularly common faults are those which affect the brittle surface of a photographic print; paper-clips, and writing on the back, for instance, may cause marks which although not obvious to the eye will be recorded by the camera. In the same way, the correction and adjustment of tone originals is more difficult than that of line originals. Adjustments to photographs are best left as far as possible to engravers and printers who have studios where such work is carried on. Special equipment is necessary, too; an air-brush, for instance, can cover selected parts of a photograph with evenly graded grey tints.

There are times when the reproduction of reproductions cannot be avoided. Line reproduction can usually be reproduced in line, though collotype is the most accurate process for this purpose. Half-tones are best reproduced with a finer screen than that of the original, and with the screen at a different angle. A good collotype print is perfectly suitable for half-tone reproduction; conversely, collotype can usually produce a tolerable result from even a coarse half-tone print. Gravure prints lend them-

selves fairly well to half-tone reproduction, particularly if the cell-pattern is fine.

§177 · CALLIGRAPHY

Calligraphy is graceful writing, whether formal or informal; it is usually understood to be distinct from lettering, which is the construction of letters with pen or brush or any other tool in a manner too formal and laborious to be used merely for communication. Success in calligraphy is achieved only by long practice, and the work of a first-class calligrapher tends to be expensive; handwriting in printed books is therefore usually confined to a few display lines. At the present time, however, the fashion of italic handwriting is gaining ground, and it is quite possible that in the future more typographers will be competent to produce calligraphy for the books they design. A clear and graceful italic handwriting may, for instance, make an attractive feature of notes and underlines in a book printed by offset; the process is particularly suitable for the reproduction of handwriting, and the cost of production is not increased as it would be by line-blocks. Type tends to look anaemic when reproduced by collotype; handwriting, on the other hand, may not be spoilt by pale colour.

The style of the calligraphy can, of course, be adapted to the content of the book. Most successful examples are based on letters of traditional design; the less conservative styles of letter are more successful in advertising. Nothing is gained by the use of handwriting in imitation of type; the purpose of calligraphy should be to produce an effect which could not otherwise be obtained.

The planning of illustrations can be among the typographer's most rewarding tasks. If there is something of the artist in his nature—as there is in the nature of every good designer—illustration may provide more opportunities for creative work than does the strict discipline of the typographic design. By no means all the by-ways of style and of reproduction methods have yet been adequately explored, and there is scope for experiment and achievement by the typographer as well as by the illustrator.

BOOKS

BIGGS, J. R. - Illustration and reproduction - Blandford Press, 1951 - quarto: illustrations. [A description of graphic methods and of reproduction techniques.]

BLAND, DAVID – The illustration of books – Faber and Faber: 2nd edition, 1954 – illustrations: bibliography. [A concise history and a useful short account of techniques now in use.]

BRINKLEY, JOHN, and JOHN LEWIS – Graphic design – Routledge, 1954 – quarto: illustrations: bibliography. [Includes illustrated accounts of the work of leading artists.]

- BUCKLAND-WRIGHT, JOHN-Etching and engraving: techniques and the modern trend Studio, 1953 illustrations. [Describes many processes, including those which might be used for limited editions, though not for other kinds of book production.]
- CRANE, WALTER Of the decorative illustration of books old and new First published in 1896: 3rd edition, Bell, 1921 - illustrations.
- DARTON, F. J. HARVEY Modern book illustration in Great Britain and America Studio, 1931 quarto: mainly illustrations.
- JOHNSTON, EDWARD Writing and illuminating and lettering (The artistic crafts series of technical handbooks) Pitman: first published 1907; twice revised, 23 reprints illustrations. [Essential not only in connection with book illustration but as an introduction to the study of letter-forms and type.]
- See also, after chapter 1, JENNETT; after chapter 11, GRAY; after chapter 13, CURWEN and GAMBLE; after chapter 15, GRIFFITS; and in § 241, BLAND and HASSALL.

Paper

Paper has ingredients, a structure, and mechanical functions. That paper is the main material of the book is obvious—that effective presswork and binding, and the visual and tactile qualities of the book, depend on the right choice of paper is less so. The fact that paper is usually made to order for bookwork offers the designer opportunities not only for the exact fulfilment of his requirements but for the practice of some initiative in specifying material. Here, as elsewhere in book design, initiative is all too rare; but the use of utterly unsuitable paper is quite common, and mistaken policies and tendencies are still to be seen. Thick, fluffy, feeble, antique featherweight papers, for instance, are still widely used to give books a deceptive bulk.

In this chapter the main materials and processes of paper-making are described, with particular reference to text paper. There are, of course, innumerable other kinds of paper, and the book designer has on occasion to choose the paper for endpapers, covers, wrappers, and jackets. These varieties of paper are much too numerous to be considered here, but once a general understanding of text paper is gained, it can quite easily be extended to cover them.

The nature of any kind of paper is determined by its furnish—the material of which it is made—and by the processes which go to its making. There is no fixed range of paper qualities; characteristics can be made to order, within limits. A sheet of paper is a thin mat of cellulose fibres, felted together by being suspended in water and then drained. In outline, the conversion of fibres into paper begins with the reduction to pulp of the raw material. The pulp is then processed, and formed into a sheet; finally the sheet is passed through further stages in order to induce whatever surface characteristics may be required.

§178 · FIBRES AND PULP

The cellulose fibres used in paper-making are those which form the skeleton of various kinds of vegetable growth; before being processed, they have to be cleaned of their ligneous and other encrustations. Different

kinds of fibre are often mixed in a single sheet of paper, in order to obtain the desired combination of characteristics.

There are three main sources of cellulose fibre; the first includes cotton, linen, and hemp. The fibres in these materials are known as normal or simple cellulose, and they are weakened less than any other kind of cellulose by the drastic processes of purification which lead up to paper-making. Various kinds of grass, such as esparto and straw, form the second source of fibres; these are compound cellulose fibres, which tend to be weakened to some extent in the course of their reduction to pulp, and which therefore form a rather less durable paper than the first group. The third source of fibres is wood, which produces another form of compound cellulose; this forms a paper which is less durable than any composed of compound grass or simple fibres. Cotton, linen, and hemp are by far the strongest, and most costly, fibrous materials for paper-making. As a rule they are used only for the very best papers. The raw material consists of various kinds of rag, waste, rope-ends, and so on; it is sorted, chopped up into small pieces, dusted and boiled in caustic soda to remove impurities and to weaken artificial colouring.

Cotton produces an extremely strong white paper; it is mixed with linen to produce paper of the best quality. Linen fibres make an extremely stiff and strong paper; owing to its stiffness, it is rarely if ever used alone. Linen and cotton are combined in bank-note and hand-made paper, but are rarely used to make book papers in large quantities. Hemp is scarce and costly, and is rarely used alone; the highest qualities of India paper, however, consist mainly of hemp. The resistance to tearing and folding of papers made from simple cellulose is due in part to the length of the fibres, and of all the fibres mentioned hemp is the longest.

The means by which the raw material is reduced to pulp depends partly on the nature of the material and partly on the result required. In order to pulp the compound group of fibres, esparto or straw is sorted, dried, dusted, boiled, washed, and bleached. Esparto grass is the most common material for the better qualities of book paper made in Britain (it is less widely used abroad). A proportion of wood pulp is usually added to esparto papers, to give easier running on the paper-making machine, and to increase the strength of the finished sheet. Offset and gravure papers, and the body papers for art and chromo papers (§ 184), are usually more than 50 per cent. esparto, the balance being wood. Particularly good esparto papers are made in Scotland, because of the ample supplies of clean, soft water available there.

Esparto papers tend to be bulkier than those made from wood fibre, and are not particularly strong. Their dimensional stability is good; their small but even contraction and expansion when dried and damped makes

them ideal for lithography. They take dye well, and tend to be fairly opaque, with a pleasant creamy colour. Esparto papers receive and retain a watermark well. Their most striking quality, however, is their clean, soft, and pleasant surface, with its natural affinity for ink.

Straw, because it is home-grown, is less expensive than esparto, and was used as a substitute during the war. It can be reduced to pulp by processes similar to those used for esparto, and makes a paper with less resistance to tearing, and with a reasonably even stretch when damped. The appearance of a sheet when held up to the light—its look-through—has a marked tendency to spottiness, owing to tiny knots crushed by the calenders (§ 180) of the paper-making machine, but an adequately white and opaque paper with a smooth, close, and even surface can be made from straw. To handle, straw papers are hard and rattly, with a good resistance to varnish which makes them useful for jackets.

Many kinds of fibre are produced from wood. There are two main groups of wood pulp; the better pulps are those which have been purified chemically, by boiling with acid or alkaline solutions; the cheapest are not purified at all, but are simply ground up mechanically. The former process produces what is known as chemical wood pulp, the latter, mechanical wood pulp.

Wood which is to be chemically purified is first stripped of its bark, and the knots may be drilled out at this stage. The wood is then cut up into chips and boiled to remove impurities and ligneous encrustations from the fibres. The colour is removed by bleaching. Sulphite pulp, which is in general use in Britain, is produced by boiling with various kinds of bisulphite liquor. Different methods of digestion produce different grades of sulphite pulp: strong bleachable pulp (which is not substantially weakened by bleaching) is used for cartridge papers and sometimes for mixing with mechanical wood in newsprint; easy bleaching pulp is mixed with esparto to produce printing papers of good quality; bleached pulp is used in softer printing papers, for which cleanliness, opacity, bulk, and whiteness are more important than strength. In general, sulphite papers tend to be less bulky than esparto, and slightly less opaque, with a clean look-through; the bright white colour is an attractive feature of the material. Sulphite pulp is particularly versatile, and can be treated to produce anything from blotting-paper to bank-notes.

Wood for pulping by mechanical means is first stripped of its bark. It is then ground to pulp against grindstones, cooled and cleaned with water, and is afterwards screened and strained to remove chips and lumps. The omission of the lengthy boiling process, which makes mechanical wood extremely cheap, leaves all the ligneous encrustation in the pulp, and makes the material greatly inferior in strength and durability to chemically

treated fibres. Mechanical paper can be very opaque with a good bulk and absorbency; the paper, however, is not strong enough either to support its own weight while wet during making, nor to be used, unless reinforced with a proportion (usually about 15 per cent.) of chemical pulp; it is unpleasantly fluffy in printing, and after a period of exposure to light, because of its content of ligneous matter, it becomes discoloured and brittle. Different methods of grinding produce different qualities of pulp. Hot ground pulp is made with very little water in the grinder; it is used for newsprint and for bulky mechanical antique papers. Cold ground pulp, made with more water and lighter pressure against smoother grindstones, is less bulky and fluffy, and has a better surface (finish), opacity, look-through, and feel. Bleached mechanical pulp is bleached only superficially, to brighten the colour and improve the printing qualities; it is sometimes mixed with 30 to 40 per cent. or more sulphite to produce an inferior book paper.

§179 · PROCESSING THE PULP

The preparatory processes which the pulp has to undergo depend partly upon its nature and partly upon that of the paper required. The processes briefly described here are the main processes usual at this stage, and each may take various forms.

The first may be breaking and washing. The breaking-engine consists essentially of a barred roll revolving close against a serrated bed-plate. The fibres, suspended in water, are dragged between the roll and the plate, and by this means unknotted and separated from each other. They may also be bleached at this stage, and the bleach and any impurities will be washed out while the pulp is in the breaking-engine. Separate bleaching is a more costly process, but produces a purer and stronger fibre.

Beating is the central process of this stage, doing more than any other to determine the nature of the paper; from the same fibre, different kinds of beating can produce anything from a blotting to a grease-proof paper. The beating-engine is similar to the breaking-engine, but, instead of the blunt bars of the roll, bars of varying sharpness and materials are used. Beating first splits open the fibres, and seems to expose the adhesive material inside which makes them cling together when the paper is made; then it frays out the ends, or fibrillates them, increasing the strength and compactness of the paper; finally it cuts the fibres to different lengths, according to the kind of paper required. Prolonged beating imparts hardness and rattle to the paper, making it less absorbent; if the pulp is beaten

¹ There is a certain doubt about this; what actually happens during beating is not known for certain.

too long, the paper may be brittle, inelastic, and discoloured. After a short period of beating the paper will be bulky and opaque, as in antique wove (§ 184); beating of medium length produces a thinner and tougher paper with a good surface; long beating, a strong thin paper with reduced absorbency and opacity.

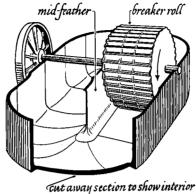
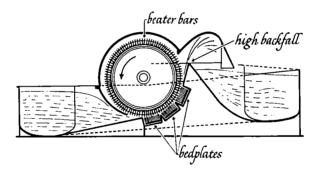


FIGURE 54. Above, the breaking-engine; below, the beater.



Loading is the addition of mineral to the fibre in the beater. The most common form of loading is china clay in various qualities. Titanium dioxide is very expensive and is normally used with china clay; it is extremely white and opaque, and has excellent covering power, so that its use renders a paper not only much whiter and more opaque but stronger because of the reduced amount of loading necessary.

The addition of loading makes the paper cheaper (except when titanium is used), more opaque, and more compact; particularly in soft-sized or unsized papers, it makes the colour brighter and more even; the material is very receptive to printing ink, and improves the printing quality of the surface, especially when the paper is made from chemical wood. Since mineral, unlike fibre, is inert, the addition of loading reduces the

expansion and contraction of the paper in changing humidity. Too much loading reduces the paper's strength, bulk, and durability, and diminishes the effect of sizing; highly finished papers which contain too much mineral also tend to deteriorate in damp conditions. Ordinary printing paper usually contains about 15 per cent. loading, imitation art (§ 184) up to 30 or 35 per cent.

Engine-sizing is carried out by the addition of size—usually resin, starch, or water-glass—to the pulp in the beater. Resin improves the paper's crispness, colour, and finish but reduces its opacity; it is susceptible to light and air, so that in the course of time many engine-sized papers may tend to lose their ink resistance and some of their colour and strength. Water-glass is oil-resistant and increases the durability of the paper. Animal size is rarely added in the beater, owing to its high cost; it is the best form of size, and its addition is known as animal sizing. Engine-sizing may improve the finish of the paper, and controls the extent to which it absorbs printing ink, whether on the surface or in the body of the sheet.

Dyeing and colouring are further processes carried out in the beatingengine. Precise colour-matching in paper-making is extremely difficult; the nature of the materials and of previous and subsequent processes all have their effect on colour. There are several different kinds of colouring material. Some of the mineral colours have a high specific gravity, so that when the paper is being made they sink to the underside of the sheet and make it darker in shade than the upper side. They are fast to light and atmosphere, and produce delicate tints. The coal tar dyestuffs produce a less two-sided paper, are cheap, and can be had in an unlimited range of colours; many of them, however, deteriorate in light, and are sensitive to heat and damp.

§180 · THE FOURDRINIER MACHINE

The paper-making machine on which most printing paper is made is known as the Fourdrinier, from the name of the first holders of the patent in Britain. Almost any Fourdrinier is huge; the biggest is colossal, and these machines are in fact among the biggest single production machines in the world. The paper is made in a continuous web and reeled up when completed, even if it has later to be cut into sheets.

The pulp, of which about 99 per cent. is water, is poured out on to a continuous, travelling wire mesh which is shaken slightly from side to side in order to prevent all the fibres from lying along the direction of travel (the machine-direction). However well-finished the paper may be, it tends

¹ The Library Association's Committee on the Durability of Paper recommended in 1930 that a paper durable enough for satisfactory library use should not contain more than 15 per cent. of loading (*Book construction*).

to be marked by the wire and slightly rougher on the underside or 'wrong side' of the sheet. The liquid pulp is prevented from flowing off the sides of the wire by the deckle, a strap which moves along each edge of the wire and which can, if necessary, be moved inwards to produce a narrower web of paper. The maximum making width of the machine is also known as the deckle. As the wire, thinly spread with pulp, advances—and that of a newsprint machine may travel at 1,500 feet a minute or more—the water drains out of the pulp and the fibres are felted together; draining is accelerated by tube rolls and suction-boxes under the wire.

When the sheet has begun to form, it is pressed down by a hollow wire-covered roller, called a dandy-roll. This presses some more of the water out of the sheet and closes it up, and is often used to impart a water-mark of some kind. At the point where the wire covering of the roll touches the sheet, the fibres are slightly pressed down, so that the paper is thinner and more transparent at that point than elsewhere. The most commonly used type of dandy-roll now in use has a cover of fine woven wire, which leaves a fine and sometimes all but imperceptible woven pattern in the sheet; paper of this kind is known as wove. Another kind of dandy-roll has a grid pattern of wires, with close thin wires running across the machine direction and thick, widely spaced chain wires running along; paper made in this style is known as laid. Laid paper is an imitation, so far as water-marking goes, of the old hand-made papers, which until late in the 18th century were always made with a laid watermark derived not from a roll but from the wire on which the paper was made; it is in fact an anachronism, and as such is sometimes considered unsuitable for modern use. The printing trade, however, is not generally intolerant of anachronisms; whatever its origin, the laid watermark is an attractive one, and is still in frequent use for important books. Less common is the spiral dandy, in which the direction of chain wires is across instead of along the machine direction; they seem to do more to arrest the flow of pulp under the dandy, and so impart a slightly different appearance to the sheet.



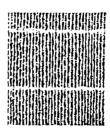


FIGURE 55. A very approximate comparison of the look-through of wove paper (left) and laid.

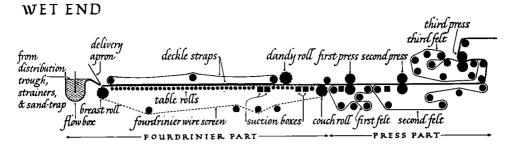


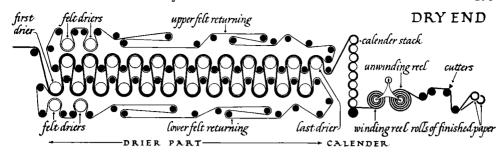
FIGURE 56. Above and opposite, the Fourdrinier paper-making machine.

There is nothing to prevent a printer or publisher from having a dandy-roll made with his own water-mark; the cost is not excessive, in comparison with that of a few tons of paper, and when invoicing paper made from this roll the paper mill may deduct $2\frac{1}{2}$ per cent. of the amount invoiced until the whole cost of the roll has been repaid. The roll would then be the property of the mill, not the publisher; in any case its use would be restricted to a single mill. A well-designed water-mark should always fall in the same position on the sheet. The best position is perhaps near the edge of the sheet, so that the water-mark will appear in the margins of the page, where it will be clearly visible and will not interfere with the printing. A conspicuous water-mark may weaken a solid printed over it.

After passing under the dandy-roll the paper is subjected to suction or pressure, or both, which increase the strength and compactness of the sheet, reduce its bulk, and smooth its surface by removing some of the rough finish imparted by the felt which takes the weight of the moving sheet of fibre soon after it passes the dandy-roll.

Twin-wire papers are made on the twin-wire Fourdrinier; two separate wires make two separate sheets of paper which are pressed together while still wet, with the wire-side of each inwards. The result is that the paper is perfectly even-sided, showing no wire-mark, and ideal for surface printing processes, particularly in colour printing. Paper of this kind cannot be made in substances below 23 lb. demy (§ 185).

It is the drying cylinders which extend the Fourdrinier machine to its enormous size; the paper is carried by an endless reel of felt round the long series of steam-heated cylinders which dry the water out of the sheet. Part of the way along the series of drying cylinders is a set of smoothing rollers or calenders; the paper may pass by these intermediate machine calenders, since they reduce bulk considerably, but most good papers with a smooth finish pass among them, losing some of the roughness left by the wire and the felt.



After a further set of drying cylinders, the paper comes to the machine calenders, which may give it any kind of smooth finish up to a really smooth and even surface. If an exceptionally smooth finish is wanted, the paper has usually been heavily loaded; it is damped on the machine calenders and rolled with their full weight. This water-finish tends to emphasize any spots and impurities there may be in the paper.

§181 · SEPARATE PROCESSES

Separate processes are usually kept to a minimum for industrial printing paper, on account of their cost; they are, however, sometimes necessary when paper is required to perform a special function.

Animal tub-sizing is not invariably a separate process since the necessary equipment can be connected with the paper-making machine, but this is unusual. The paper is dipped in a tub of gelatine, and carried over a long series of hollow rollers which dry it by contact with hot air. The paper will then take writing, erasure, and rewriting extremely well, and indeed the process is usually reserved for writing-paper. Tub-sizing, which leaves a layer of size on the surface of the paper, stiffens the sheet and greatly improves its strength, durability, feel, and look-through.

Less expensive papers are sometimes tub-sized with feculose, a form of starch, and sometimes a thin coat or 'lick' of this kind of size is applied on the Fourdrinier before the paper passes among the drying cylinders. Though less effective than animal tub-sizing, this process is much cheaper; in combination with engine-sizing, it greatly increases ink resistance.

Plate-glazing is another expensive process, usually reserved for hand-made, mould-made, and the very best machine-made papers; the sheets are pressed under rollers, between glazed metal plates. This imparts a finer and more durable finish than can be obtained by other means; the surface is softer, glossier, and more even-sided: there is no lowering of the colour, and less reduction in bulk.

The usual method of producing a shiny surface is by super-calendering; this entails damping the paper and passing it among a set of rollers

separate from those on the Fourdrinier. The weight of the rollers tends to discolour the paper slightly, and by crushing and spreading any knots or impurities in the paper it emphasizes them. The finish is much less durable than a plate-glazed finish, but since its purpose is usually to accept half-tone printing this does not greatly matter; once printing is complete the finish is no longer required.

On leaving the Fourdrinier and any separate processes the completed paper is cut into sheets, unless it is to be printed from the reel. No paper should go straight from the mill to the printing press if this can possibly be avoided, although most mills are equipped for the artificial maturing of paper; in maturing, a sheet may change size by a fraction of an inch, and a pause of a few days at the very least for conditioning either at the mill or in the printer's warehouse will make closer register possible.

§182 · COATED PAPERS

Coated papers are those which consist of a core or base of ordinary paper coated on one side or both with a mineral material. This kind of paper presents to the printing-surface a finish which is perfectly even, dead flat, and non-absorbent to ink; it is used mainly for half-tone printing by letterpress, but may also be useful in any work, including colour offset, where extreme regularity of finish is needed.

The quality of the body paper is important since any faults of surface are exaggerated by the coating. The best body papers are esparto, chemically purified wood (preferably deciduous), or straw with sulphite wood for strength. For cheaper coated papers sulphite may be used alone, and, for the cheapest, sulphite with mechanical wood.

The coating, which is usually china clay, may be anything from about 5 to 40 per cent. of the finished weight of the sheet. The coating of a good-quality art paper is brushed on wet and dried in hot air; paper of this kind is usually about half as expensive again as an ordinary text paper.

A paper intermediate in quality between brush-coated art and imitation art can be made by machine-coating; the coating is brushed on to the body paper, which often contains mechanical wood, on the Fourdrinier, before the drying cylinders. The paper is known as machine-coated art.

A variety of finishes can be applied to art paper; most qualities have a glossy super-calendered finish, but others are sometimes used. A less vigorous super-calendering produces a duller finish, and some matt art papers are almost rough. Enamel art papers are friction-glazed to produce a hard mirror finish. A similar finish is sometimes produced by polishing with a flint stone.

Chromo enamel and chromo one-sided paper are coated on one side

only with a coat thicker and duller than that of ordinary art paper. They are very suitable for plates in book illustration when the quality is high and the pictures are not to be backed up, or for jackets to be printed in four-colour half-tone.

§183 · HAND-MADE AND MOULD-MADE PAPERS

Until the Fourdrinier machine came into use at the beginning of the 19th century, all paper was made by hand from simple fibre. The great endurance of such paper is to be seen in ancient books; after 450 years or more the pages are as clean and bright as they must have been when they were new. Paper is still made by hand, and mainly because of its prodigious resistance to deterioration hand-made paper is still chosen for the production of certain costly books. Its price is extremely high, and may be five or six times that of a machine-made paper of decent quality. For a book which is designed to maintain its quality for more than a few generations, hand-made paper is often considered obligatory, and the cost is accepted, though the best machine-made rag papers may in fact be equally durable.

The first distinctive quality of hand-made paper is its furnish. The most expensive of materials and of processes are practically inseparable; there would be no point in making hand-made paper from anything other than rags. The pulp—usually of cotton and linen mixed—is poured into a vat, where an agitator at the bottom prevents the fibres from settling.

The paper is made by a vatman, with a skill which can be learnt only by years of experience. His equipment is a wire mesh, either wove or laid, stretched on a rectangular wooden frame known as a mould; if there is to be a watermark, it is sewn in wire on the mesh. The watermark in handmade paper, formed in the underside during making instead of in the upper side after formation, is often very clear and perfectly formed. The preparation of a special watermark is comparatively inexpensive. Fitted round the edges of the mould is a removable rim; this is the deckle which prevents the pulp from flowing off the wire. The vatman dips the mould, with the deckle in position, into the pulp, lifts it out with its coating of pulp, and shakes the mould to and fro and from side to side in order to lay the fibres evenly in all directions. When most of the water has drained through the wire, the deckle is removed.

Some of the fibres penetrate between deckle and mould, and when the paper is finished these give the sheet a rough edge all round; this is known as deckle edge, and it attracts more attention than it deserves. The more worthy kind of bibliophile regards the presence of deckle edges in a book as a guarantee that his copy has the margins originally planned by the printer. This may be important, for instance, in a book printed by Bodoni,

many of whose books are characterized by the great width of their margins; a copy without deckle edges, if any copies exist with them, might be regarded as imperfect. Other book-owners regard hand-made paper as a hall-mark of the best quality, and a deckle-edge as a hall-mark of hand-made paper; therefore the deckle edge must appear—and printershave not been unwilling to comply. Deckle edges in books catch dirt, and prevent

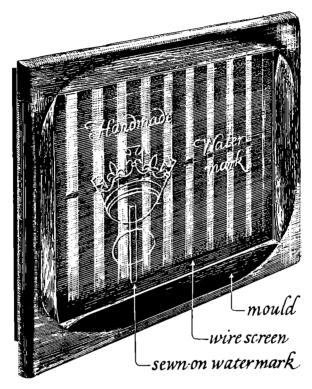


FIGURE 57. A mould for making paper by hand.

the pages from being turned over easily; they are better cut away, and bibliophiles left to assess the quality of paper by other means. On no account should deckle edges appear at the head of the page, where they catch the maximum amount of dirt; and if possible the fore-edge should be cut too, since it may become only slightly less dirty.

The mould is taken from the vatman, turned over and pressed on to a sheet of felt; when it is removed the sheet of pulp remains on the felt. Alternate sheets of felt and paper are laid on top; the pile is pressed, then the felts are removed and the paper pressed again. Finally the sheets are laid out or hung up to dry in the air; this takes several days, and is part of the reason for the paper's great strength.

The dried sheets are tub-sized, and once again air-dried for several days before being plate-glazed; here again, the gradual drying greatly increases the effect of the size.

The most valuable quality of hand-made paper is its durability; not only the paper but the printing on it, if worthy inks are used, will retain its nature almost indefinitely. This should give the designer pause, for the surface will faithfully preserve pretentious and careless work no less than the best the designer and the printer can do. In addition to its durability, hand-made paper is far stronger than other paper in handling and folding. Its stiffness, due partly to the length of the fibres, partly to the absence of grain (§ 185), and partly to the tub-sizing, should be taken into account; however good the paper and printing, a book which will not lie open is second-rate. The absence of grain makes the sheet equally stiff and strong in both directions. Hand-made paper expands and contracts less than machine-made, and evenly in both directions. If the sizing is too hard the surface may not be receptive to ink; here again the paper might spoil an otherwise admirable book by making good presswork difficult. The sizing is usually too hard for entirely successful printing unless the sheets are slightly damped; damping makes possible a firm impression into the sheet, which compensates for its uneven thickness, without undue indention.

Mould-made papers are in effect imitations of hand-made, and are slightly cheaper. The pulp is deposited on moulds revolving in the pulp round the circumference of a cylinder, and the remaining processes are usually similar to those described above. Mould-made papers may be very similar to those described above; the deckle edge is slightly different, and there is often less flexibility. The most obvious difference is in the unevenness of flexibility, strength, and dimensional stability across and along the sheet. The cost of a mould-made paper is three to four times that of a decent machine-made printing paper.

§184 · PAPER CLASSIFICATIONS

Papers are classified sometimes by finish, sometimes by their purpose and the processes used to make them, and sometimes by a combination of these three characteristics with or without other characteristics. The one thing that is certain is that the description will not be comprehensive; and if there is the slightest risk of designer and paper merchant misunderstanding each other, samples of paper should be relied on rather than descriptive terms. People concerned with paper not unnaturally omit the word paper from most of their descriptions, and speak of 'a cartridge' or 'a printing'.

Antique paper is that most commonly used for bookwork; it receives

little or no finish from the machine calenders, and its surface is rough or at least matt, reflecting no glare from the page. This surface is well suited to type in which the strokes need strength, and to line-blocks without fine lines or large solids, but not as a rule to half-tones. It is bulky and opaque; since it absorbs ink well, it is suitable for use on perfecting presses. It tends to be creamy in shade; in Britain it is made as a rule of either esparto or straw, though cheaper grades are made of sulphite or even mechanical wood. Antique wove has no particular pattern in look-through, and tends to have a slightly more even surface than antique laid. Featherweight antique is extremely thick, weak, absorbent, and fluffy.

The chief characteristic of cartridge paper is strength rather than whiteness, since it is unbleached or only semi-bleached, and not heavily loaded. It is usually made either from esparto and wood, or from straw and wood; its finish is rough or matt. Cartridge paper is most commonly used for endpapers and jackets, and special cartridges are made for surface processes. Offset cartridge is one of these; it is a well-sized paper without fluffiness, with the grain the long way of the sheet and a small and even expansion when damped. The best kinds of offset cartridge are made on a twin-wire machine and are perfectly even-sided.

Machine-finished (M F) is a comprehensive classification which includes most papers which have been bleached and receive some finish from the machine calenders but do not go through any subsequent processes other than sorting and so on. The surface stops short of being glossy. Such papers are rather smooth and less bulky than antiques, and are well suited to types with strokes of medium thickness, to line-blocks, and even to half-tones of about 100 screen; with the right qualities they may be used for offset and collotype. Litho M F of good quality is made from esparto or straw with 10 or 15 per cent. loading; it should be well-sized, evensided, and dimensionally stable. Varnishing litho is a hard-sized wood or esparto litho paper which will take varnish after printing, and is wellsuited to use for jackets. Collotype paper is a strong, smooth MF, evenly and thoroughly sized, and usually of a cream or creamy-white colour. Music paper is a rather thick paper suitable for offset printing. High MF is a smooth-surfaced paper intended for half-tones of screens up to about 100.

Bible or India papers are extremely thin papers of excellent quality, strong, opaque, and fine-surfaced. The furnish is usually hemp or wood, and the loading often includes titanium. A fine-mesh wire and a wove dandy of fine mesh are used. The weights may be less than 8 lb. demy 528s, less than a half or even a third of that of most papers; in this weight, 1,000 pages bulk only about $\frac{3}{4}$ ". Owing to the high quality, the cost per ream is apt to be greater than that of ordinary papers, although the weight

per ream is much less. The printing and folding of such thin paper are necessarily slow and therefore expensive.

Plate paper is thick and soft, rather soft-sized, intended for fine plates in book illustration printed by offset or other alternative processes; the thickest qualities are sometimes twin-wire papers calendered on one side only.

Parchment papers were at one time made in imitation of parchment skins, but the term is usually applied now to smooth but not glossy papers of good quality, often sized with starch for crispness. Parchments are strong and opaque with an even look-through. Parchment wove differs only in having a high white colour and a particularly even look-through.

Super-calendered papers, known as S C, are made and used for special purposes. The calenders which give them their glazed surface tend to darken their colour and reduce their bulk; the spottiness of the look-through is also emphasized. They are, however, suitable for half-tone blocks of about 120 screen; rather strongly drawn types look best on them. Photogravure paper is often super-calendered, and imitation art or half-sized litho papers are sometimes used for this process; the paper should, if possible, be twin-wire. Imitation art is a heavily loaded paper which is either super-calendered or thoroughly machine-calendered. It is usually made of esparto, straw, or sulphite. The surface glaze of this kind of paper and its close, even finish are intended for finer screen half-tone work of second quality. Newsprint is the cheapest paper used for the text of books; although admirable for newspapers, it is unsuitable in any form for books which are to be kept for any length of time. Its furnish is mainly mechanical wood, possibly with some sulphite for strength.

Japanese or japon vellum is costly and rare, being made from Eastern fibres such as ramie and paper mulberry. It is thick, creamy, and glazed, very tough and durable, in some ways a better and more attractive paper than hand-made for books of the first quality. Machine-made imitations bearing the same name or variations on it are inferior.

Coated or art papers are intended as a rule for register colour work, and particularly for good half-tones with finer screens, over 120-line. Most coated paper is brilliantly white and has a glaring reflection, though tints and matt finishes are possible. The surface should be perfectly flat and smooth, and even in colour; the fibrous core of the paper is hidden by the mineral coating, so that the surface has a mechanical rather than a natural appearance. For its weight, a heavily coated paper is substantially less strong than an uncoated paper, because of its high mineral content. Art paper is ruined by damp.

Paper of this kind is essentially a modern material, and seems to suggest a modern treatment. The spare eighteenth-century style of display and

imposition common in mid-twentieth century typography relies for much of its charm on the surface of the paper, which is amply exposed. To use the unattractive expanse of a coated paper in the same way is not only anachronistic but unsuitable; better, perhaps, to cover up as much as possible of the surface with large half-tones, bleeding off the page, and with strong dark type, filling up most of the page even if rather wide leading and narrow margins have to be used.

One-sided art is used for proofs and for plates and jackets; chromo, offset chromo, and proofing chromo papers are one-sided. Offset chromos have to have a coating that will not pick off in contact with the damp plate. They are used for their absolute evenness and solidity of surface, which accepts a perfectly formed dot.

Machine- or cylinder-coated paper is intermediate in quality between imitation art and brush-coated art; it is used for half-tone work, preferably with screens no finer than 133, and for colour work of the second quality.

Art paper is available in four degrees of finish—bright (fully glazed), bloom (semi-glazed), semi-matt (very lightly glazed), or matt (unglazed). Matt art has no glaze, and may be made to approximate to text paper in surface, but it marks easily in handling and requires blocks of a rather coarser screen than the higher finishes.

§185 · PAPER SPECIFICATIONS

Most mills make paper to order if the order is for a ton or more. A making costs less per pound than does similar paper bought from a merchant's stock. The discriminating typographer is more likely to get exactly what he wants if he orders it than if he buys from stock. When the paper is ordered, its classification should be followed by the size of the sheet in inches, the ream-weight in pounds, the ream-count in sheets, and any details that may be out of the ordinary. A typical description would read, 'White twin-wire offset cartridge 35×45 , 110 lb., 516s, long grain'.

The weight of the ream is usually an indication of the thickness of the sheet, though this is approximate. The actual weight of the sheet usually concerns the designer only when a large book is being planned and there is some danger of excessive weight making the book awkward to handle. Art paper is extremely heavy as a rule, and before deciding to print a long book on art paper the designer should calculate its final weight. The weight of paper can be checked in a simple quadrant sheet scale which indicates the ream weight from a single sheet.

The thickness, or bulk, of the sheet limits to some extent the number of pages in the sections into which the sheet is to be folded, since a sheet

¹ Grain along the longer dimension of the sheet.

which is folded too many times may break along the thickest fold. Only the very thinnest papers, such as bible and India, can safely be bound in sections of 64 pages; 32-page sections are often used when fairly light papers, of not more than demy 20 lb., are bound in cheap books, but smaller sections are to be preferred; 16-page sections are the most common in good book production; 8-page sections are usually necessary only when the paper exceeds demy 35 lb. The thickness of the sheet will naturally determine the thickness of the book, and this should be calculated when many more or fewer pages than usual are expected. Sheet thickness can be checked with a micrometer, and in case of variations the check should be carried out all over the sheet. For accuracy in calculating book thickness, a dummy of the book in the form of folded sheets can be obtained from the merchant.

The bulk of the book should always be calculated before the paper is ordered. This is particularly important in the production of fiction; the public still has a lamentable tendency to judge the value of a book by its size and thickness. A novel of average length and price may well prove difficult to sell if it bulks much less than $\frac{7}{8}$ " over-all. On the other hand, a general work such as a biography may intimidate the reader if it is much over $1\frac{1}{8}$ " thick.

The size of the page and that of the sheet are naturally related very closely; the dimensions of either may determine those of the other. If the designer wishes to use the full capacity of the machine, he may have the paper made to fit the press, and calculate page size by subdivision; more often, having decided the format of the book, he calculates the sheet size by multiplication. To find the uncut page size he adds $\frac{1}{8}$ " to the width and $\frac{1}{4}$ " to the height of the page. By multiplying each dimension, usually by 2, 4, 8, or 16, he finds how it will fit into a sheet size convenient for the available presses. For instance, if the format is to be $5\frac{1}{2}$ " $\times 8\frac{1}{2}$ ", the untrimmed page will be $5\frac{5}{8} \times 8\frac{3}{4}$; $5\frac{5}{8}$ " $\times 8 = 45$ ", $8\frac{3}{4}$ " $\times 4 = 35$ ", and the book can be printed on a quad demy sheet and press. But if he wishes to use a bigger press, the designer will have to multiply $8\frac{3}{4}$ " $\times 8 = 70$ ", and there are few presses of this size in British book-printing offices.

The stiffness of the paper is determined partly by its thickness and partly by the nature of its fibres; rather thick, hard-sized hand-made papers are sometimes excessively stiff for bookwork. Since the stiffness of the sheet may prevent the pages of the book from lying flat, it should be tested if there is the slightest doubt. This may be done by cutting a thin slot about \frac{1}{8}" deep across the surface of a piece of wood about the size of the average book when open. This slot will represent the sewn edge of the book, and the backing of the section. A piece of the paper for testing, cut to the size of an opening of the intended book, can then be folded into

two leaves, and the fold fitted into the slot; if necessary, a piece of thread inside the fold will hold the paper into the slot. If the two pages lie reasonably flat when open, the paper is probably of a suitable stiffness. It is essential to cut the test sample in the same direction relative to the machine direction of the paper as the printed pages will eventually be cut.

The grain or machine direction of the paper is the direction of travel of the Fourdrinier's wire. Most of the fibres lie parallel with the grain, and the paper is more flexible along the grain than across it; if the book is to open well and lie flat, the sewn edge must therefore be parallel with the grain. The expansion and contraction of the sheet when damped or dried is greater across the grain than along it, since the cross-grain direction of the sheet contains by far the greater number of fibres. The offset printer prefers to have the maximum expansion the short way of the sheet, in order to minimize its effects; the cross-grain expansion over 35" would, of course, be only about three-quarters of the expansion over 45". For black printing only, the offset printer can usually use short-grain paper; but for register work, long-grain paper is essential. This necessity may cause binding difficulties if anything other than an upright octavo page from a quad sheet is planned. A demy quarto book printed offset on a quad demy press, for instance, or an octavo book on a double-demy press, would have to be bound across the grain. The letterpress printer also likes to have the grain along the sheet, but since the grain is less important to the letterpress than to the litho printer, the paper grain of a letterpress book is always specified to suit the binding. The grain can be tested by cutting or tearing off a piece of the sheet and damping one side of the piece; it will roll up into a tube along the grain. Dimensional stability can be tested by measuring the sheet across the grain, damping it on both sides, and measuring again. Mould-made papers have a less strongly contrasted grain than machine-made, and hand-made paper has no grain at all.

The strength of the paper to resist the strain of folding, and its resistance against tearing, determine to some extent the strength of the binding. Folding strength is particularly important in endpapers and cover papers, which have to support the movement of the board. Comparative tests of strength can be carried out without special equipment; the standard sample for comparison and the paper to be tested must, of course, both be tested either along or across the grain. The resistance of both papers to tearing can easily be noted and compared, simply by tearing one after the other. Each paper may be folded, first in one direction and then in the other along the same line until it breaks, every fold being smoothed out lightly with a ruler; a comparison of the number of folds each endures provides a very approximate indication of their comparative folding strength.

Durability is an important quality in paper, and as a rule is subject only to the test of time. It should include resistance to light and retention of finish as well as actual strength. The durability of paper intended for an important book is vital; if hand-made paper is out of the question, the designer should specify the best possible fibre and the lowest possible percentage and highest possible quality of loading. Sizing should be as light as possible, unless tub-sizing can be afforded, and fugitive dyes must be avoided.

The finish of a paper, its smoothness of surface, depends partly on the nature of the fibre, partly on the percentage of loading or nature of coating, and largely on the amount of calendering it has received; a matt art paper, for instance, although thickly coated, may have a less glossy finish than an imitation art. Finish has a considerable influence on the appearance of the printed image, particularly in letterpress printing. Alternative printing processes are influenced less drastically by finish, but a rough hand-made paper is not ideal either for fine-grain collotype or for fine-screen offset half-tones, and a super-calendered paper is better for gravure than a machine-finished. A hard, flat, even surface tends to give the most faithful result, whatever the process, and this is why coated papers are sometimes used for offset printing, although offset can produce a reasonably faithful image on almost any book paper. Unless a paper is coated or heavily loaded, a high finish may tend to reduce its opacity and its bulk.

The two-sidedness of paper is the difference between the 'right' side (which was uppermost when the paper was made), and the 'wrong' side (which was next to the wire). Anything which will print better on a smoother surface, such as a half-tone, should, if possible, be printed on the right side; to make this possible the designer may have to arrange such blocks in alternate openings of the book throughout. This should be necessary only when half-tones are printed on uncoated and uncalendered paper. Even a slight two-sidedness may cause an uneven effect when an alternative process is being used, and an obvious two-sidedness, whether of surface or colour or both, is a fault in any paper.

Finish and even-sidedness can easily be tested by inspection (the finish of art paper should be inspected very carefully indeed), but the tendency of paper to fluff in printing is difficult to test effectively without laboratory equipment. Fluffiness has a wide variety of causes, the chief of which may be that the sheet was poorly sized, not adequately compacted on the wire before drying began, and not thoroughly calendered. Fluff causes a great deal of difficulty on the press, particularly with surface processes, and may both spoil the printing and increase its cost.

The opacity of paper is vital both to the legibility and to the good appearance of the book. The type on the verso of the page should never

be more than just visible through the recto—if the letters can be seen distinctly, they will begin to interfere with reading. If the type of the next page but one can be seen through the recto, the paper is unsuitable for book production. Good quality and opacity are not by any means the same thing; opacity is not among the predominant virtues of cotton and linen fibres, but mechanical wood makes a particularly opaque paper. Opacity can, of course, be tested by holding a piece of the paper over some printing of an appropriate blackness, and a standard can be worked out by seeing how many thicknesses of the paper are required to obliterate the difference between a solid black and white.

The unavoidable dilemma with paper is to obtain all the desirable qualities, since the inclusion of one quality may well exclude another. Bulk is the most obvious example; if the designer wishes to increase the bulk of his paper without increasing the cost per ream, he is certain to lose smoothness and strength and to increase the tendency to fluff. A smooth surface (in an uncoated paper) and a white colour both tend to reduce opacity. Resistance to tearing and folding is apt to be synonymous with resistance to ink; it is the softer papers which are easier to print.

§186 · COLOUR

Among the light shades of paper that enable the type to appear in a suitable contrast there is scope for an enterprising choice. On the whole perhaps small type, delicately drawn illustrations, and half-tones are best on white paper, so that although counters are small and dots or stippling close, the paper will appear brightly where its appearance is needed. Larger types, particularly if they are fairly bold and have open counters, remain legible on tinted paper, and, since paper is often made to order, some experiment with different shades is possible.

To match the colour of a making of paper with a given sample is extremely difficult for the mill, but admirable results are usually achieved. The colour of the making can be tested only by comparison with the sample, and both must lie on the same background; both sides of the sheet should be examined. An extremely white paper like white art gives the most faithful results in colour reproduction, but this intensity of colour is usually considered to be rather a strain on the reader's eyes. For ordinary reading a slightly toned paper is preferable, and the tone is usually cream, the natural colour of the purified fibre; an attractive use might, however, be made in books of the delicate azure colours used for stationery. Any darker colours tend to reduce the contrast between type and background, and so to interfere with legibility. The colour of highly finished papers should always be closely examined, since heavy calender-

ing tends to darken the fibres, and this tendency may become excessive. Colour and finish also affect opacity; of two otherwise similar uncoated papers, the creamier and rougher will be a little more opaque than the white.

The colour of paper should, as far as possible, be even throughout the book, even if two or more kinds of paper have to be used. If illustrations are to be printed as separate plates, the mill may be able to make a text paper to match the paper used for the plates or vice versa. Letterpress half-tone plates usually require art paper, and look best if the paper is white; white paper is almost essential to the success of colour half-tones. A white wood paper may then be better for the text than the more usual creamy esparto paper. Continuous-tone pictures tend to look best when printed on a white paper, but a slightly creamy paper for plates may match better with text paper; if matt art is used for letterpress, or if the plates are printed by an alternative process, the designer may be able to match the papers for text and plates not only in colour but in surface or apparent surface. If a near match is impossible, the use of two obviously different papers may be the next best thing. Part of the success of the design of a book lies in the reader's ability to see what the purpose of the design is, and to realize that the intention has been fulfilled. A near match in colour may appear to be a mistake; an obvious difference will probably look like an intended effect. The possibilities of strong contrasts in colour between text and plate paper are, however, rarer in bookwork than in the production of magazines and catalogues.

No amount of care on the part of the designer in the choice and arrangement of type and illustrations will redeem a book marred by unsuitable paper. The unprinted part of any page forms a background and a frame for the printed image, and the typographer no more than the painter can afford to neglect background and frame. More important still, the quality of the presswork depends to a large extent upon that of the paper. On the nature and grain of the paper depend much of the book's endurance in use and ability to open easily and lie flat. A right choice of paper, then, so far affects both the visual and the structural qualities of the book that it may be described as the basis of successful book design.

BOOKS

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- NORRIS, F. H. Paper and paper-making Oxford University Press, 1952 illustrations. See also, in § 241, OVERTON.

Bookbinding

Most of the preceding pages have dwelt on visual aspects of design. In the planning of bookbinding the designer must also concern himself with mechanical quality. The prime virtues of a good binding are mechanical—the ability to hold the text pages together and to protect them, to open flat, to endure in use and storage, and to withstand both climate and time. Visual design offers scope for invention; mechanical planning is a matter rather of choosing methods and materials from among those which are practically and economically possible.

The visual and tactile qualities of a binding also deserve meticulous design. Decoration in industrial bookbinding is still in transition, partly because in Britain today it is so seldom and so sparingly used; its possibilities have not been fully explored. The design of lettering, for instance, and the choice of materials are too often mediocre. Much of the cloth used by bookbinders is either drab or gaudy, and lacks those qualities of surface that might please the hand or eye. Yet the professional book designer has no reason to be less imaginative and less severely critical in the choice of cloth than the dress designer, and his field of choice is wide enough.

Bookbinding is the multiple operation by which the flat printed sheets are converted into a form in which they can be used by the reader and kept on the shelf. More than a dozen processes combine to produce a book bound in the style usual in industrial manufacture, and a book bound by hand in the traditional manner passes through more stages still.

The techniques of manual bookbinding, the chief of which are known as 'in-boards' and library binding, produce a very strong book indeed. Briefly, the text pages are sewn on to cords or tapes which are drawn through or fixed into the covering boards. If the materials used for text and binding are worthy of the method of construction, an in-boards binding may last in use for centuries; bindings 200 or 300 years old are common enough in antiquarian bookshops to be cheap. Such binding is now too slow and costly for general use. Few copies of any book, except for an occasional limited edition, are bound in-boards before the initial sale. Even those individuals who can afford the best seldom trouble to have many of their books bound or re-bound in this style; paper and printing

which deserve it are all too rare. Library binding, as its name implies, is used by libraries for rebinding books which otherwise would be worn out by constant use.

The appearance but not the structure of the in-boards binding is imitated by the cased binding, which can be carried out cheaply and quickly by machine. The cover of the book—its case of cloth and strawboard or millboard—is fixed to the text pages only by paste and paper, and rough handling or frequent use will usually separate cover and text. This style of binding, which is by far the most often used in Britain, is described in the pages that follow in greater detail than the less common manual styles.

The appearance of the cased binding in turn is imitated by the unsewn binding, in which a flexible coating of glue holds separate pages together at one edge. In another form of the same style the pages are connected by a metal or plastic spiral gripper.

In addition to all these, there are many forms of binding in which details of these processes are modified or omitted; instead of a cloth case, for instance, a limp paper cover may be fixed round the text, or the sections of a short book may be inset, one inside the other. By understanding the structure and working of the bound book, and knowing what machinery, material, and skill are available, the designer can usually find a binding method that will suit the purpose and price of any kind of book.

§187 · IN-BOARDS AND LIBRARY BINDING

The processes and materials used in manual methods of bookbinding are costly, and as a rule are reserved for books printed on paper of high quality; such paper is strong enough to last as long as the binding that encloses it. In the same way, there is little to be gained from the use of hide covers with methods of construction less thorough than those of the in-boards binding: the cover is certain to outlast its attachment to the text. In-boards binding is not so much a better way of binding as a different way; construction is matched in strength with material.

Folding is the first bindery operation. The flat printed sheets are folded by hand, usually with successive right-angle folds, until the sheet becomes a section, usually of 8 or 16 pages. The hand-folder disregards the edges of the sheet in folding, and adjusts the position of each fold by registering a part of the printed text on one page, such as a page number, with that on its neighbour. This is useful when the deckle-edges of hand or mould-made paper remain on the printed sheet. Hand-folding is slower and more accurate than machine-folding.

Endpapers are the leaves which lie between the cover and the text of the book. Their main purposes in hand-binding are to conceal the inside of the cover board and the joint between board and text, and to take the strain of the opening and closing of the board, which otherwise would fall partly on the outermost sections of the text. At several stages in hand-binding there are several methods that can be used, and the making of endpapers is one of these. The various methods are similar in that they produce endpapers which open right down to the folded edge, and which are intended to be sewn together with the text.



FIGURE 58. Endpapers in an in-boards binding (left) and in a cased book.

The sections are sewn to each other by stitches which pass through the back fold, and which on emerging from inside the section are carried round cords which lie across the spine of the gathered sections. Binders of the old style use 'raised bands', that is, cords which lie across the spine and form ridges across it when the book has been covered; others cut grooves in the spine, in which the cords lie, so that the back will not be ridged in this way.

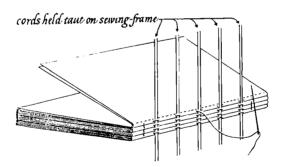


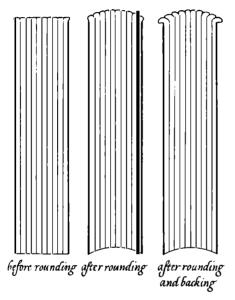
FIGURE 59. Sewing in hand-binding.

The spine of the book is covered with flexible glue, which fixes the sections together and keeps the book in shape. Some or all of the edges are sometimes left uncut and untrimmed; some of the pages are thus connected to each other along a folded edge, others may show a deckle edge.

When laid on a flat surface and closed, the book is now thicker at the sewn edge than at the others by the accumulated thickness of the thread inside the sections and the glue between the sections at the folded edge. The thickness of the bound book must, however, be even, and this extra

¹ For the distinction between cutting and trimming, see § 195.

thickness at one edge is therefore disposed of by hammering the spine into the familiar convex shape, or rounding it. After rounding, the book is backed; the tendency of the back of the sections to spread outwards is encouraged, so that the outermost form a hinge for the boards. The individual pages are so bent outwards along the inner side that some of the strain of opening and shutting will be taken by the bend instead of by the sewn edge. The rounded and backed book now takes a shape which it would tend to retain even if there were no sewing, and this shape shares the strain with the threads.



head band sewn the adband stuck on under lining

FIGURE 60. Rounding and backing.

FIGURE 61. Headbands in binding by hand (left) and by machine.

Slips of vellum or similar material are laid across the spine, one at the head and one at the tail, and are sewn to the sections, usually with silk thread and in a decorative manner. These headbands take the strain of the finger which pulls the book from the shelf, and hide the joint between cover and spine.

The projecting ends of the cords on to which the sections are sewn are laced through the covering boards, which have been cut to size. The boards project slightly beyond the text pages in order to protect their edges, and these projections are known as squares.

A rectangle of hide, usually leather or vellum, is pasted to the outside of the book—both the boards and the spine—and turned in round the edges of the boards. Another method is to fix on the spine of the sections a tube of paper, or Oxford hollow, and to fix the cover to this; the back

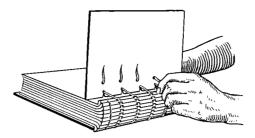


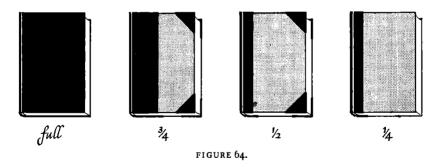
FIGURE 62. Lacing cords into boards.

of the book is then hollow, and the spine of the cover is not forced upwards and inwards when the book is opened, in a manner which may have ill effects on decoration and lettering on the spine. This latter style is used when the cords are recessed.



FIGURE 63. Left, an Oxford hollow; right, a fixed back.

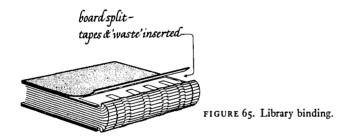
In the best binding the whole cover is of hide; the wear on the corners and edges of a book is as heavy as that on the hinge between board and spine. A book bound in this manner is said to be full-bound. If only the spine and the corners are covered with a strong material, and the sides with a weaker material such as cloth or paper, the book is said to be half-bound, and will begin to wear first along the edges. A book of which the spine only is covered with the stronger material is quarter-bound, and is likely to wear first at corners and edges.



The lettering and decoration of the book are usually in real gold, which is the only metal which will retain its brightness for an appropriate length of time. The gold leaf is pressed into the cover with hot tools in such

a way that the pattern, recessed below the surface, is protected against handling and contact with other surfaces. Any large area of decoration is normally built up with the multiple impression of small tools; the slightly varying angle of strike causes the pattern to reflect light from gilded surfaces at a variety of angles. Another form of decoration is that of inlays, in which hide of contrasting colour is fitted into patterns cut in the cover.

Library binding, mainly used by public libraries, is similar in principle. The sections and endpapers are sewn on tapes, which are laid between the two parts of a two-ply board; the board is then closed and glued together. The spine is covered with a paper hollow, and the cover, usually of buckram or some other stout cloth, is pasted on.



§188 · CASE BINDING

Some binding craftsmen of the old school like to assert that the methods described in the previous section are the only true ways in which a book can be bound; they say that the mechanical techniques in wide use today are not binding at all, but something else. For lack of a better term, however, the newer methods are generally known as binding, and are sometimes called case binding, because the finished book is not a single mechanism but is two parts attached to each other—the text pages and the separately made case or cover. This is the method usual in industrial book manufacture, and is therefore described here in some detail.

Industrial bookbinding is usually understood to include the supply of some or all binding materials, the insertion of the books into their jackets, and packing and delivery. These items combine with the multiple operations of binding to make the cost of binding a high proportion of the cost of production. When economy is essential it is often a material or process of the bindery which suffers first.

The purpose of case binding is, by mechanical techniques and with machine-made materials, to produce a book superficially similar to a book bound in the in-boards style. The procedure and equipment of modern binderies has come into being to fulfil this purpose. By diverging at some points from the conventional appearance of bound books, binders can, however, produce bindings which in mechanism and cost may be preferable to conventional styles. New techniques are still evolving, and new materials are already available.

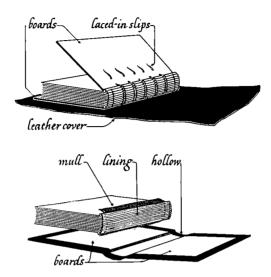


FIGURE 66. Above, a book bound in boards; below, a book and its case.

§189 · IMPOSITION

Some aspects of imposition have already been considered in § 135.

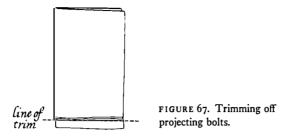
Imposition is, of course, governed by folding methods, and since a wide variety of machines, as well as hand-folding, are in use, and since a number of impositions can be used with any one machine, the number of possible impositions used is considerable. Thirty-four of the more common impositions used with eleven of the more popular types of folding machine are described graphically in *Book impositions*.¹

An imposition scheme can usually be understood by folding a small piece of paper, numbering the pages so formed, and unfolding the paper again. If plates are to be placed inside a section, the designer may need to know which edges are closed, and which are open; the closed edges are known as bolts. Plates can, if necessary, be passed through a bolt, but the slitting of the bolt by hand entails extra cost. If plates are placed under a bolt in the head, there is some danger that, before the book is sewn, they may slip down slightly in the section.

If a book is to have a roughly trimmed tail, instead of the usual cleancut edge, the binder cannot use those schemes in which the sections are

¹ British Federation of Master Printers, 1946.

printed, folded, and sewn two at a time or two up, attached head to tail or tail to tail, since the sections have eventually to be cut apart on the guillotine.



In the production of new books other than fiction the 'tops and tails', or preliminary and back pages, are often printed last, because the preliminary pages may be altered at the last moment, and the back pages include the index, for which copy is not received until the page-proof stage. The tops and tails may therefore be planned for imposition together.

§190 · FOLDING

No book's production succeeds because of success at any one stage; any book can be spoilt by failure at any one stage. At some points rather than at others in their production books seem to be particularly vulnerable, and several of these points occur in the bindery. The inaccurate folding which tends to result from the high speed of modern production is one of them; in a badly printed or folded section, the text lies askew, or out of position even if square with the edges, and the appearance of the book is ruined. The typographer can do nothing to redeem this fault once it has occurred, but he can minimize the risk of folding difficulties, as well as economize in folding costs, if he understands the techniques.

Folding machines place their folds a fixed distance from the lay-edge of the sheet, and take no account of the text area. The fold may be in the centre of the sheet or elsewhere. Machines now in use vary widely in capacity, and in product. In size, the biggest commonly used for bookwork can deal with a sheet slightly over 8-crown, so that crown formats are the most economical for folding as for printing in long runs. To know the maximum sheet capacity of a binder's folders may be nearly as valuable as to know the size of a printer's presses.

Folds may be parallel or at right-angles, and optional or compulsory. Some machines are equipped with turn-tables, so that, for instance, successive parallel folds can be converted at will into right-angle folds.¹

¹ See the diagrams of folding machines in Book impositions.

The number of pages in the section is governed by several factors. The thickness of the paper is influential, since thick or brittle paper such as art does not take well to repeated folding. Paper over demy 20 lb. is usually better folded in 16's than in 32's, and over demy 35 lb. should be folded in 8's. Too much thickness at the folded and sewn edges strains the paper and may stiffen the section so that it does not lie flat enough. If the book is to contain a great number of pages, the number of sections should be minimized, or the combined thickness of the sewn edges will become excessive. A compromise is possible here by folding the sections in a thickness suitable for the paper and insetting one into another for sewing. A very long book on demy 25 lb. paper, for instance, could be sewn in inset 16's—one 16 inset into another to make a 32-page section. The normal method of sewing the sections together is known as 'continuous 16s'.

The format, too, has its influence on the thickness of the section; 8's are often used for quarto books, 16's for octavo, and 32's for 16mos.

Hand folding is still used in industrial bookbinding, usually for particularly difficult paper, or for oddments not big enough for a folding-machine. Certain impositions can be used for either hand or machine folding.

§191 · ENDPAPERS

An endpaper in cased binding is a 4-page section of plain or printed paper pasted or 'tipped' along the spine of one of the outermost sections of the book, and not sewn through. Its functions are the same as those of the endpaper made by the hand binder, and in addition it fixes the text to its cover by trapping the mull and tapes (§§ 194, 197) between the board leaf of the endpaper and the board itself. The strain of the board's movement falls mainly on the endpaper, and since inevitably some of the strain is passed on to the outer sections of the text, strength may be gained if these outer sections are printed on a particularly strong paper. The endpapers may also be strengthened by the addition of a strip of linen down the spine edge; they can then be sewn in the same way as the text sections, in order to attach them more firmly to the rest of the book.

The material should, as a rule, be stronger than the text paper, because it has a more exacting mechanical task. In order to prevent warping and to allow of easy opening, the grain of the endpaper should run up the book. A common substance for ends is 30 lb. demy. This question of strength should be borne in mind when special paper is chosen for ends which are due to have a particular purpose. Decorative paper, for instance, however attractive, may not be nearly strong enough for the purpose; and even if photographs are to be reproduced on the ends, art paper should on no account be used, because of its brittleness.

A survey of 410 books withdrawn from a public library as unfit for further use¹ has shown that in nearly all the books the endpapers were split or broken away from the book. This suggests that the endpaper may be the weakest point in case binding, and that increased strength at this point will lengthen the life of the binding.

Printed endpapers are often attractive and useful (figure 82, page 386), but should be used with care, since in rebinding—and public libraries normally have to rebind their books—the endpapers are often destroyed. Most libraries also paste record cards on to the front endpapers. Crucial maps, diagrams, and so on should therefore appear in the text rather than in the ends.

Coloured papers are sometimes chosen for endpapers. These may be coloured on one side (having been either made on a twin-wire machine or printed on one side) or on both; there is no harm in a coloured page facing the half-title, which is the first page of the book rather than part of the opening, and the same is true of the last page of the book. Tinted endpapers can be bought in quantity and used for a series of books; they tend to be more expensive than plain paper, but bulk buying reduces the price. However attractive its colour, paper must not be used which will not suit the construction of the book; the paper must be strong and must have its grain in the right direction. Endpapers are usually supplied by the bookbinder, who is apt to be more concerned with strength than with colour; the colour of endpapers to be supplied should be discussed with the binder if any work of high quality is in hand. For ordinary books, a slight difference of shade between endpaper and text paper is not perhaps a serious fault.

Most endpapers match the text paper, more or less, and do not need to be considered in relation to the outside of the book. Tinted endpapers should be chosen to match or harmonize with the colours to be used for the outside of the book. If, for instance, the book is to be bound in green cloth and blocked in yellow metal foil (§ 202), green or yellow might be particularly suitable colours for the endpapers. A match between paper and cloth is not always easy to arrange, even when one material or the other is made to order, and before deciding on any particular endpaper the designer will do well to look for samples of cloth that will match it or harmonize with it.

§192 · PLATES

Plates are illustrations which are printed separately from the text. This may be necessary because they are printed by a different process from the

I P. G. B. UPTON: 'The breakdown of publishers' bindings' (Penrose Annual, 1953).

text, or on a different kind of paper; or they may be printed on a larger page, which is folded to fit into the book when not in use.

There is a number of ways in which plates can be fixed into a book, and none of them is entirely satisfactory. Ideally, a plate should appear opposite that page in the text on which the first reference to it appears. In practice, this is not often possible in a manner consistent with secure binding.

So far as placing the plates appropriately in the text is concerned, the best method is to tip them into the section; that is, to attach them to the inner edge of a page with a strip of paste. Without much difficulty the plates can be placed anywhere in the book. The weakness of this method lies in the plate's insecurity of tenure; careless handling, or time, or both, will remove it from the book. Unless the tipping is very accurate and is confined to the backed portion of the text page, the tipped plate will raise the text page to which it is attached when it is turned, in the same way as the endpapers do (figure 31, § 103).

Equally useful for placing, and considerably more secure, is the guarding of plates. A guard is a strip of material along the sewn edge of a plate or page; the strengthened endpapers mentioned in § 191, for instance, are known as guarded ends. The guard is not necessarily a separate piece. A guarded plate is one which has extra paper at its inner edge; this extra paper is carried round the sewn edge of the text page next to the plate towards the centre of the section, is sewn through with the section, and appears as a thin strip of paper in a previous or subsequent opening of the same section. The weakness of this method is the unsightly appearance of the guard, and, if there are many, the extra thickness added to the spine.

A neater and more secure method still, that of wrapping round, allows some of the plates to be placed opposite their references if necessary. The plates are made up in units of four pages, or in multiples of four, and are wrapped round the section or part of a section and are sewn with the section. This is a neat and secure method, but the position in the section

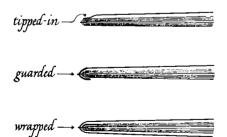


FIGURE 68. The three principal methods of fixing plates into the book.

of one side of the wrap-round determines that of the other side. Illustrations arranged in the same way can, of course, be inset in the centre

of a section. If the plates are printed on one side of the paper only, they will occupy alternate left- and right-hand pages; if they are all to appear on recto pages, they will have to be printed on different sides of the paper.

Plates may be grouped as separate sections, and placed arbitrarily in the book, often at the very end, even after the index, where they seem to be an afterthought, or near the centre of the book, where they appear to intrude. As a rule, this method is satisfactory only when the plates form a large part of the book. The arrangement is the simplest for the binder, but may not always suit the reader.

The difficulty of placing plates near the relevant pages of text emphasizes the value of processes by which text and illustrations can be printed together. The great need is for a comparatively inexpensive and entirely effective method of reproducing continuous-tone originals on paper favourable to the printing of text. Although a deep-etched block of comparatively coarse screen can be used on text paper, the quality of the result cannot approach that of a fine-screen block on art paper. For the time being, then, the book designer must accept the necessity of plates and of their attendant difficulties.

When the quality of reproduction is of the first importance, plates should be printed on one side of the page only, unless the paper is absolutely opaque, otherwise the darker tones of one illustration, showing through the page, may confuse the lighter tones of another.

An unattractive but often necessary form of plate is that which is folded, either because it is bigger than the page, or because it is to lie clear of the text when open, or both. A sheet of any reasonable size can be folded small enough to fit into an octavo book, and can be guarded into a section, but such plates should be kept to a minimum; the extra thickness tends to distort the shape of the book, and if several elaborately folded plates open out by mistake, the exasperated reader may spend minutes replacing them. Plates which are to fold clear are so placed on the sheet as to leave at one side the full width of the page and a little extra for the guard. They should always be positioned in the book so that they can lie open beside the text, facing upwards, whenever the book is open at relevant passages. The very back of the book is a common position, and ingenious binders have even extended one leaf of the endpaper to form a folding plate, so avoiding the necessity for a guard.

The fold must of course come within the cut size of the page to avoid being cut off by the guillotine. This causes an impression of the fold to appear on several pages on either side of the folding plate: the greater the number of folds, the deeper the impression.

§193 · GATHERING AND COLLATING

The sections, with their endpapers, and plates if any, are gathered into the order in which they will appear in the book, and are checked (collated). To assist this process a collating mark has been printed on the spine of each section, usually consisting of a small black oblong; inaccurate folding or printing may cause this mark to appear between the sections when the book has been bound.

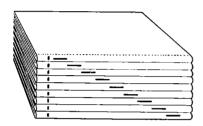


FIGURE 69. Gathered sections with collating marks.

§194 · SEWING AND NIPPING

The sections are laid side by side and sewn together by machine. For extra strength, the outermost sections are sometimes first side-sewn with a sewing-machine similar to that used by housewives—that is, sewn through the spine from front to back with a succession of small stitches.

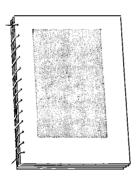


FIGURE 70. Oversewn sections.

Each stitch is knotted at the head and tail of the section, so that a broken thread may allow the section to fall out but will not release the adjacent sections. A book consisting of single leaves may have to be oversewn by hand (figure 70).

The use of tapes in case binding is controversial. The strength of a binding of ordinary size is said to depend not on tapes but on the glue and the lining applied to the book; the tapes may even weaken the back by

preventing the glue from reaching the whole extent of the back, and by thus providing points of weakness at which the back will begin to break. A heavy book, on the other hand, may need tapes to hold the text sections together. The sewing can either pass over the tapes, or, for extra strength and at extra cost, can pierce them and so fix them even more securely to the sections. Tapes which are merely glued to the spine of the book add very little to its strength. For ordinary octavo books two tapes are usually considered enough; greater weight and larger formats require three or more. Tapes are an unattractive feature of a case binding, and tend to give an untidy look to the inside of the board.

After sewing (sometimes before) the book is crushed under a press (nipped or smashed) in order to drive out the air between the pages and so to solidify the binding. This process loosens the sewing, but the threads are tightened again in rounding and backing (§ 196).

§195 ⋅ TRIMMING AND CUTTING

The purposes of cutting the edges of books on the guillotine, so as to make each edge flat and solid when the book is shut, are to separate the pages from each other, to prevent the edge from retaining dust or allowing dust or light to penetrate on to the surface of the page when the book is closed, and to make the pages easy to turn over and neat in appearance. Nearly all industrially produced books today are cut at least at head and fore-edge.

The tail, which is less susceptible to dirt and is not used for turning the page, is sometimes trimmed; the projecting bolts only (if there are any) are removed with a revolving knife, so that some pages are longer than others. This gives the binding a certain pleasant irregularity, and appears to make all the pages rather longer than they would be if cut.

If the binder is equipped with three-knife guillotines, which cut all three edges of the book at one operation, trimming is an extra process which involves extra expense; otherwise, trimming replaces the third cut.

§196 · GLUING, ROUNDING, AND BACKING

The back of the book is fixed in shape, and the sections are fixed closely to each other, by the application of a coating of flexible glue to the spine. While the glue is still damp enough to be malleable the back is rounded and backed. When the book contains maps or other illustrations, which are to run across the opening without intermission, rounding and backing are sometimes omitted or minimized, so that every opening lies perfectly flat, and the whole surface of every page is visible right down to the sewn

edge. A rounded and backed book is likely to retain its shape longer than one with a square back.

§197 · LINING AND HEADBANDING

The back of the book is re-coated with glue, and a form of coarse muslin known as mull is laid on the spine, falling short of head and tail and overlapping along each side. The neatest disposition of mull is to have it nearly as long as the spine, with an overlap at each side equal to the turn-in of the cloth over the board at the fore-edge. The inside of the board then has a ridge of fairly even width all round its edges—cloth turned in at head, tail, and fore-edge, mull at the back. For strength the mull should perhaps extend rather farther.

Reinforced mull is sometimes used for strength; at intervals the crossthreads are woven more closely together. This is said to be a satisfactory substitute for tapes, and is certainly neater. An alternative to mull with or without tapes is linen, or some equally strong material, which is stronger and neater still but substantially more expensive.

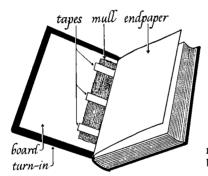


FIGURE 71. A cased book before casing-in.

The survey described by Upton suggests that the second most common cause of disintegration in case bindings is probably the breaking of the mull or its stripping from spine or boards. Valuable strength may therefore be added to the book by the use of a reinforced mull, with a fairly wide overlap on each side of the spine. The advantage of mull is that it allows paste to penetrate freely, and so binds endpapers, mull and board closely together.

The purpose of these forms of reinforcement is not only to strengthen the back but to fix the book into the case; the overlapping material is gripped between board and endpaper, and so holds the text of the book to its boards.

Bookmarkers seem to have gone almost completely out of use, although they are not particularly difficult to fix into the book, and can perform their function without being of the highest quality. A piece of suitably coloured ribbon, however slender, can be not only of real use to the reader, but a decoration to the book.

Headbands in a case-bound book are an anachronism, since they do not strengthen the book or conceal the hollow as do sewn headbands. They are supplied ready-made, and are glued to the spine before lining. Since the form of the case binding is an imitation of an in-boards binding, the use of headbands for decoration may reasonably be excused.

A strip of stout paper, known as a second lining, is glued down over the mull, to hold it down, to stiffen and strengthen the back, and to share the strain of opening and shutting.

§198 ⋅ EDGE-COLOURING

The practice of edge-colouring is derived from that of edge-gilding, but since colour does little or nothing to exclude dust it can hardly be considered a substitute. Coloured edges do not show dirt so quickly as uncoloured edges, if the book is to be continually handled. If the edges are stained the colour tends to penetrate a little beyond the edge of the page; the fore-edge is particularly subject to this, because the rounding forces the edge of one page slightly beyond that of its neighbour. Edges may also be sprinkled; the effect is pleasant, and penetration less.

Edges are often coloured to match the cloth, or are coloured red regardless of any colour scheme, in imitation of the red colouring laid under the gold on the gilded edges. Pleasant colour combinations between edge and cloth are not, however, difficult to find.

Modern bookbindings tend to be severe in appearance, but certain books may benefit from any exuberance of fancy the designer may happen to enjoy. One rarely used form of decoration is to have a rubber stamp cut to print ornament on the edges; another is to spray the edges through an ornamental stencil.

The text of the book is now ready for casing in (insertion into the case), and the next sections deal with case-making, an operation quite separate from, though carefully co-ordinated with, those already described.

§199 · BOARDS

Boards are usually supplied by the binder, but, since their nature determines to some extent the character of the binding, the designer should specify the kind of boards to be used.

Chipboard, made from chips, is a cheap form of cardboard which warps easily and cracks, and should not be used for anything but the very

cheapest books. Warping is the most conspicuous weakness of all but the best boards; a board which is flat when it leaves the bindery (and even when it leaves the publisher's warehouse) may bend into a hideous and inconvenient curve in the bookshop or on the shelf.

Most books are bound in strawboard, which is made in various qualities. It is supplied in $25 \times 30''$ size, and its thickness is designated by the weight in pounds of one board. A 1-lb. board is about $\frac{1}{25}''$ thick (0·04"). Millboard, which again is made in various qualities, is much less susceptible to warp, and is substantially stronger; its thickness is described in decimal fractions of an inch (e.g. 0·056", 0·064", 0·070"), and for equal thicknesses it is rather heavier than strawboard. Millboards are harder and more solid than strawboards, and being considerably more expensive are usually reserved for work of high quality.

The thickness of the board should be proportionate to the format, thickness, and nature of the book. For instance, 1-lb. strawboard may be considered suitable for foolscap octavo books, $1\frac{1}{4}$ lb. for ordinary crown octavos, $1\frac{1}{2}$ lb. for particularly thick crown octavos and for large crown 8vos, 2 lb. for demy 8vo, and over 2 lb. for royal octavo and larger books. Particularly thick or particularly important books benefit from extra thickness in the board, which gives any book a pleasant solidity as well as a more durable cover.

When thick boards are used for expensive books the outer edges of the boards are sometimes (though rarely) bevelled. This gives the binding an indefinable air of high quality; its purpose is to prevent the board from having in effect two sharp corners along each edge at which the cloth may tend to wear.

§200 · CLOTH

Any cloth can be used for bookbinding if it is strong enough and can prevent glue laid on its back from penetrating to its surface. Even an unsuitable cloth can be used if it is first lined with stout paper. Considerable initiative is therefore possible in the choice of cloth. Most cloth used in book production is made specially for the purpose, usually in rolls 36 to 38" wide (the selvedge of an inch or so at each edge being useless) and 36 yards long. A making of cloth is usually seven or more double rolls of 72 yards each; the price is rather lower if the cloth is made to order, and the designer then has the opportunity to specify colours and materials.

The furnish of most bookcloth is cotton; linen, which is considerably stronger, is used only in cloth of the highest grade.

The warp of the cloth is the thread which runs along the loom; if one of the threads is thinner than the other, it is usually the weft, woven across the loom. The cloth is rather more flexible along the warp, and expands

and contracts more across it; the best direction for the warp is therefore up and down the book. The binder cannot usually take this into account, but has to cut the cloth in the most economical manner possible.

Cloth may be coloured in various ways. The simplest and most common is that in which the entire material has a single colour. Attractive variants include cloth woven of threads which themselves consist of strands of differing colour, and different colours for warp and weft.

The cheaper cloths, known as white-backs, are coloured on one side only; after some wear, the colouring matter begins to wear off the outer surface and the white base appears. Better quality cloths, including all fast-to-light cloths, are dyed throughout.

Bookcloth with a paper backing is useful for limp work (§ 206), on account of the extra stiffness of the material. Most cloths are thickened and stiffened with a powdery backing, which has much the same effect as filling. Most cloth contains some filling, often of casein and similar materials, the purpose of which is to lend the cloth thickness and resistance to glue. When the cloth becomes worn, this filling tends to fall out of the cloth; a cloth filled in this manner is therefore unsuitable for offset-printed lettering and ornament, since the departing filling will take part of the pattern with it. Filling may add to the thickness and stiffness of the cloth, but does not increase its tensile strength.

In his survey of the breakdown of publisher's bindings, Upton writes:

Of the 162 cloth failures, 116 appeared to result from simple abrasive wear and in only 46 were there obvious tears at the head or tail. The peak incidence of the latter defect (in the 50 loan range) is at a later stage than that of the former (30 loans) and it therefore appears that tearing may be due to initial weakening of the cloth by abrasive wear. These observations suggest that the measurement of abrasion resistance may be of much greater importance than that of tensile or tearing strength.

Although the use of books in a public library is not necessarily typical—the books are presumably pulled from the shelf far more often than they are read—this surely shows in what way bindings suffer from conditions of maximum wear.

Some bookcloths have an artificial finish, usually imparted by calenders like those of a paper-making machine, which smooth the surface in such a way that it takes blocking particularly well. Embossed patterns on cloth are unnatural; a woven material needs no artificial surface of this kind. Imitations, whether cloth embossed to imitate leather, or paper embossed in imitation of cloth, are avoided by leading designers whenever possible.

Buckram is a cloth of fine quality, the furnish of which contains linen. Ordinary buckram is woven of cotton and linen; the strongest and most costly buckram is made of linen only. Buckrams are usually calendered, and have a smooth, solid surface which takes blocking with admirable sharpness; they contain little or no filling. Buckram is the best type of bookcloth and should be used whenever possible on all heavy books and books of reference and of permanent value.

Canvas is a rather coarse unbleached cloth, with a furnish which often includes hemp or flax; it is strong, unpolished and rough, and it is only slightly less expensive than buckram. Its surface does not as a rule lend itself to delicate blocking or to offset or letterpress printing.

Crash is a rarely used but attractive type of cloth. It is distinguished by a marked contrast in thickness between warp and weft, and a wide space between the warp threads. The individual threads too are of uneven thickness and colour, and warp and weft sometimes differ in colour.

Vellum is a term applied to almost any smooth bookcloth other than those already described. Cloths are often described as art vellum or art canvas, but the word has no particular significance.

Certain kinds of bookcloth do not fade in sunlight or after long exposure to atmosphere or damp. Any book considered to be of lasting value should be bound in a cloth which will retain its colour; other cloths fade and grow shabby after a few years. A fadeless cloth is particularly useful for books which are to be sent to tropical countries.

There are many other kinds of bookcloth, and there is confusion between proprietary names and names which indicate the quality or nature. Cloth should not be chosen by name, unless the same material has been used before, but should be selected from samples, after a close examination of the nature of the threads and of the weave and the proportion of filling. Thickness derived from filling and backing is no guide to strength, but thickness of any kind does, of course, appear to increase the thickness of the boards and give solidity to the case.

That coloured materials should not be chosen unless they are pleasant, or can be made pleasant, should be too obvious to be worth mentioning. A brief reconnaissance of any bookshop, will, however, show that many British books, even a majority, are bound in drab and even dreary colours, and that if tinted endpapers are used at all they are equally likely to be dismal in colour. Tints which would be indignantly refused for furniture covers, dresses, or indeed for any purpose other than the lettering on dustbins, are thought fit for book production. If pleasant colours are not available they should be made available; cloth-weavers and paper-mills will, within reason, supply what is in demand.

The more expensive kinds of cloth are as a rule available in a variety of attractive shades, but for some reason the colours of cheaper cloths are apt to look cheaper. The permanence of colour in cloth is just as important as shade; if a book is to be bound for keeping and using rather than for

neglect or rebinding, the best and the worst of colours will be much the same in a few years if they both fade.

The texture of cloth tends to be much neglected by book designers. Unpleasant textures are sometimes used even for expensive books—and the mechanical patterns and hard, shiny surface of embossed cloth have to be paid for, being produced by extra processes. The natural finish of a good cloth is attractive enough without any extra processing other than (at most) calendering to make the surface smooth enough for clean blocking. A very rough material such as canvas, in a natural finish, can be used as it is; if necessary, the area to be blocked can first be flattened by blind blocking.

Cloth substitutes are coming into more and more general use. No scientifically obtained data about the comparative durability of cloth and substitutes have been published, but a visit to a public library (in the footsteps of Upton) will show that substitutes appear to be at least as durable as some kinds of cloth; a substitute which will hold a book together while it is read thirty times or more is obviously strong enough for the majority of books in private ownership.

The Grange Fibre Company is the leader in this field, with Linson and its allied products. Linson appears to be a particularly stout and strong form of paper or card which is obtainable in some forty shades and some fifteen finishes. Each finish may be either glazed or unglazed; glazing adds slightly to the cost but increases resistance to dirt. The cost of unglazed Linson is about half that of a really good cloth, and about a third of the cost of buckram.

Linline is a lined form of the same material, rather more expensive and available only in four shades and a small number of finishes. Library Linson is similar in cost, and is also limited to four shades but available in the full range of finishes.

The cheaper forms are Fabroleen, with some twenty shades and one admirable hopsack finish, about two-thirds of the cost of ordinary Linson: Flexlin, similar in cost: and Milskin, about one-third of the cost of Linson, with various shades in a canvas finish.

It is unfortunate that the best substitutes for cloth have no characteristic surface of their own, but are most often used in finishes which imitate cloth.

§201 · CASE-MAKING

The cloth is cut to size, and the corners are trimmed off (mitred) with a diagonal cut. The back of the cloth (not all cloth has a distinctive back, and some unbacked and lightly filled cloths can be used either side outwards) is glued, and the boards and a hollow of stout paper, also trimmed

to size, are laid in position on the glued surface. The hollow stiffens the cloth which covers the spine, and with the cloth accepts and retains the impression of the blocking. The cloth is turned in, first round the head and tail of boards and hollow, and then round the fore-edges, and is glued down to the inner side of the case.

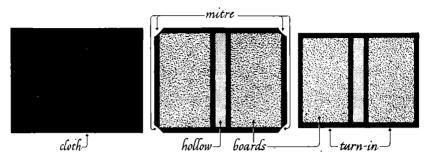
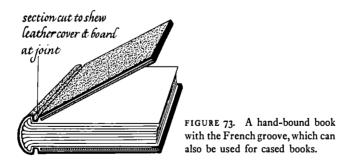


FIGURE 72. Case-making. Left, the glued rectangle of cloth. Centre, boards and hollow in position, corners mitred. Right, cloth turned in.

The boards are usually so trimmed that they will project about \(\frac{1}{8}'' \) outside the head, tail, and fore-edge of the text, and they are therefore roughly equal to the uncut size of the book. For quarto and larger books the projecting squares may be slightly larger, but in general a wide square has a clumsy appearance and has no mechanical advantage. Very big books sometimes have the squares made apparently equal—that is, the longest square, at the fore-edge, is slightly wider than the others.

A French groove or American joint is a slight extra space between board and spine, which enables the boards to swing back more freely than if they were fixed closely into the hinge created by the backing; the boards naturally have to be cut very slightly less wide.



There are various forms of three-piece or quarter-bound case which are cheaper or more decorative than the ordinary 'full cloth'. Certain case-making machines can make a case with three pieces of cloth as quickly as with one, but when such machines are not available three-piece cases have

usually to be made by hand. The extra labour that is necessary may be rather more than offset by the economy of using paper for the sides instead of cloth.

A case made with a cloth back and paper sides may be pleasant but is unlikely to have the endurance of full cloth. The wear on corners and edges is at least equal to that on the hinge between board and spine, and if the book remains in use for long the spine will outlast the rest of the case. Where endurance is not essential, however, the use of a reasonably stout decorative paper for the sides has attractive possibilities.

Equal decorative effect, and greater endurance, is possible if the case can be made of three pieces of cloth. Some American designers have achieved striking results with cases made of three different colours of cloth, the back being different from the front though both are in harmony with the spine. The width of the spine piece can be varied at will; conventionally it extends across about one-quarter of the board, but it may equally well extend to half or even more if a special effect is wanted (figure 81, page 385). The join between two different materials can be disguised and guarded by a blocked rule.

§202 ⋅ BLOCKING

Blocking is a mechanical substitute for the tooling used in hand-binding; the principle is the same, since the blocked pattern is recessed below the surface of the case.

The blocking-press uses heavy pressure and heat to overcome the roughness of the cloth surface, and to force the pattern into the surface; the heat also helps the blocking material to adhere to the cloth.

Blocking surfaces are of several kinds; various metals can be used to apply pressure and heat, according to the work to be done. If the cloth is smooth and the run short, specially cast stereos, zincos, or electros can be used. By these means, blocked lettering and ornament can have all the precision of cast type and fleurons, an advantage when the standard of brass-cutting is not uniformly high. The pattern cannot, however, be struck deeply into the surface, because the non-printing surface would come into contact with the blocking material and the cloth, nor can enough pressure and heat be used with surfaces other than brass to give the metal endurance, and any pattern blocked in this manner may begin to wear off early in the life of the book.

If the cloth is rough, if the binding number is more than a few thousand, or if the lettering is required to retain its brightness for years, brass should be used for blocking. It is almost impervious to heat and wear, and is cut in deep relief so that the blocked pattern can be deep and sharp. The lettering and ornament are printed down photographically on to the brass,

so that type or drawn lettering can be reproduced in reduced size if necessary. The design is protected with acid-resist, and the non-blocking surface round it given a preliminary etch. The cutting away of the non-blocking surface is completed by hand; the counters of the letters are cut down to $\frac{1}{32}$ " or more, and the more open areas of the design to $\frac{1}{16}$ " or more. Brass-cutters are quite prepared to follow their own style of lettering, but the best results are usually to be had from reproduction pulls of type or from lettering drawn in black ink for reproduction.

Blind blocking is the application of heat and pressure from a blocking surface, usually brass, without the interposition of any blocking material. It produces a recessed area or pattern in the cloth without any change of colour, and is often used to flatten the grain of the cloth in preparation for a subsequent impression with a blocking material. If a rough-surfaced canvas is used, for instance, the lettering may be blocked in metal from an electro on a blind panel; without the blind panel, a brass would be essential, and even with a brass small lettering might not be sharply reproduced on the rough surface.

Blocking materials are of various kinds. One of the simplest is ink, which has the advantage of an unlimited range of colours. There is no need for heat, and electros and other such surfaces are no less effective than brass when used with ink. Although the material itself is cheap, it may have to be blocked more than once in order to achieve the necessary opacity, and may therefore offer no particular saving. More commonly used is foil, which has the necessary opacity; although the range of colours is not unlimited, there is a good variety of coloured foils. Metal foils are slightly more expensive than pigment foils; the most commonly used is imitation gold, which does not share the resistance to tarnish of the true metal

A better kind of gold-blocking is gold foil, which remains untarnished for longer than its imitation, but is considerably more expensive, and may not give the same sharpness of definition as gold leaf. Ink and foil blockings can be carried out on an ordinary platen press, though for foil blocking a press with a heating attachment is often used. The foil is fed into the machine from reels; more than one reel can be used at a time, so that it may be possible to block sides and spine at the same time in different foils. The area of blocking, however, is limited by the width of and number of reels; a pattern covering the front and back boards as well as the spine would be very much cheaper to block with ink than with foil.

The best, and the most costly, material for blocking is gold leaf. The high cost is due not only to the value of the material itself, but to the extra labour involved in blocking. The design is sometimes first blocked in blind, to smooth and prepare the surface, which is next rendered adhesive

by the application of glair to the areas to be blocked. These areas are then covered with gold leaf, which has to be cut and laid on by hand, being far too delicate for mechanical handling. The blocking surface, which is usually brass, is applied again with heat, and the surplus gold is carefully rubbed off by hand, for return to the gold-beaters. This material and method of blocking gives the sharpest definition and the most lasting brightness, and in spite of cost is very properly used for most books of permanent value.

Because of the differences of heat and pressure that are often necessary, two different blocking materials cannot always be used at the same impression. Sometimes, however, more than one blocking can be afforded. One popular style is to block the lettering in gold on a panel of pigment foil, another to use metal foil for the lettering and pigment foil for the ornament. The blocking of one foil over another may, however, lead to a loss of sharpness.

The cloth colour and the colour of blocking must be appropriate to each other. This is a matter not only of colour harmony but of legibility. A light-coloured cloth will not show up lettering in gold or silver or any light colour, and should be blocked in metal foil or ink of a dark colour; a dark cloth should be blocked either in a bright metal or in a light colour. Although the colour range of metal foils is limited, one can usually be found to suit most ranges of colours of cloth.

Blocking is best confined to the area of the boards and the spine hollow, which retain the impression better than does the cloth alone; and because of the difference in thickness of the case at the hinge the binder may have difficulty in blocking solidly.

§203 · COVER PRINTING

Clearly the techniques and materials of blocking are limited and expensive, and other methods of placing lettering and ornament on cloth are becoming popular.

The oldest of these is used for small editions, because it relies on handwork. A printed or blocked label, usually of paper or leather, is pasted on to the spine, sometimes on a blind-blocked panel which smoothes the cloth and protects the edges of the label with its own raised edges. A properly fixed label will last for many years. Such labels are usually small, but may equally well cover a large part of the spine. Labels may also be placed on the front board. In case readers are nervous of losing the label, a second label can be printed on the flap of the jacket, surrounded with a dotted rule for cutting. Labels are usually simple in design, but could obviously be printed on paper in several colours and perhaps in half-tone,

if something more striking seemed suitable. Labels may be blocked on leather or even on cloth of a contrasting colour.

Cloth can be printed by letterpress in the same way as paper. If the cloth is reasonably smooth and the design not over-delicate, adequate definition from type and line-blocks may be possible. The ink on the surface of the cloth may, of course, lose its colour and opacity from handling, but for comparatively short-lived books the method is quite suitable. It is curious that it is not more often used for light novels, in the market for which competition is intense and where attractive decoration may make some of the difference between buying and borrowing (or even not reading at all). The method is inexpensive, and can give bright and striking results without being gaudy.

Even brighter decoration is possible with silk-screen printing, which is often used for book-covers in America. This process is particularly good for short runs on account of its low starting cost, and the colours are extremely opaque and bright. The pattern, laid on the surface as when printed by letterpress, is equally vulnerable, and the process is best when small letters and delicate ornament are avoided. The silk-screen printer can print successfully on the roughest of cloth.

More subtle effects are possible from printing the cloth by offset. If the cloth is reasonably smooth, delicate detail and even half-tones can be printed by this method; a 133-line screen can be used without difficulty (figure 81, page 384). The film of ink, however, is thin, and after handling the cloth tends to show through, so that the pattern fades away.

§ 204 · LETTERING AND DECORATION

The arrangement of lettering on the spine of books periodically stirs up argument among publishers and designers. All agree that lettering should read across the spine if possible, because the usual position of a book is upright on a shelf, so that lettering which reads across the spine is horizontal. The argument concerns lettering that has to read along the spine, because the legend is too wide or the spine too narrow for any other arrangement. No agreement has yet been achieved, and bookshelves present the curious spectacle of spine lettering running in three directions, upwards, downwards, and across.

Those who favour the upwards style maintain that the head is more easily turned to the left for vertical reading than to the right, and that a whole row of upwards titles on a shelf can be read in the natural direction, from left to right. Most of the other arguments for this style arise from strong personal preference or from the custom of leading publishers.

The advantages of the downwards style are less abstruse. If the lettering

travels down the spine, the title can be read when the book is lying flat and with the front of the book uppermost. The customary place for the publisher's name on the spine is at the tail; if the legend reads down the spine, the publisher's name follows the author's name and the title in the same style as textual references to books in which author and publisher are included.

Whether upwards or downwards be better, to place some of the lettering across the spine and some along is worse than either. The advantage of lettering along the spine rather than across is that unless the title is a long one the thickness and length of the spine permit the use of very large lettering, and this in turn offers opportunities for the use of decorative letters. Spine lettering, however, rarely needs to be read at a greater distance than arm's length.

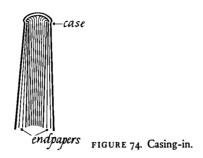
Lettering across the spine, unless the book is a thick one, tends to be rather cramped (but see figure 83, page 387). If it is type-set, small founts have to be used in order to fit the title into the available width, particularly as the convention of using capitals is more rigid for the spine than for the title-page. Very condensed types are rarely satisfactory, and the solution clearly lies in specially designed lettering. Some successful condensed sans-serif capital alphabets have been designed for this purpose, some of them marred by one or two disproportionately wide letters, but the most suitable letters for this purpose are obviously those which are naturally narrow. Black letter, for instance, lends itself to the purpose, but is hardly legible enough; italic upper and lower-case, on the other hand, is narrow without being illegible.

Case bindings are not as a rule decorated in Britain today. At one time the most elaborate designs and pictures were blocked or printed on the cloth, but at present the lettering, which may itself be treated in an ornamental manner, is considered decoration enough, possibly with the addition of a few simple fleurons and rules. American designers have developed a style of decoration which is closely integrated with both the nature of the book and the style of the lettering; the decoration is carefully placed on the available space—there is not usually an attempt to cover the whole area, but rather to use motifs and panels of ornament. Combined with an intelligent use of the available techniques and materials, this style has possibilities even in the most conservative styles of book design. At its best, the case is so designed that its decoration pleases the eye whether the spine only, or the spine and the front board, or the whole cover is visible.

§205 · CASING-IN AND JACKETING

When the case has been made and blocked, if it is to be blocked, the text is fitted into the case. This is done by pasting the outermost page of each

endpaper, placing the case round the book and pressing the complete book until the paste is almost dry, and the shape fixed. The endpaper, fixed to the board, grips the mull, and the tapes if there are any, in position, and so holds the text to the case.



The finished books are built into piles, stout boards alternating with books; the boards may have flanges along the outer edge, which, being fitted into the hinges of the books, force the cloth into the hinge. The piles are then pressed, usually for 24 hours. Adequate pressing is of great importance; if the books are taken out of the press too early, they will tend to warp.

After pressing, the books are jacketed, usually by hand.

§ 206 · SOME OTHER METHODS OF BINDING

Nearly all other mass-production methods of binding are used for the sake of economy, since none is more efficient for general work than the cased style already described. The methods outlined in this section are some of the most popular; others are also in use, and more can be devised for special purposes.

Tipped-in endpapers are sometimes omitted, and the outermost leaves of the text are pasted down to the case or cover. The strain of the board's movement is then thrown on to comparatively weak text paper. A lesser point is that the stitches show through in the opening next to the board.

Stitching, whether with wire or thread, sometimes replaces sewing. Sewing consists of multiple stitches, and its cost is obviously reduced if a single stitch is enough for one book instead of for one section only. When thread-stitching is used, the sections are inset, one inside the other; any cover is usually a limp one, into which the sections are inset; and the whole is fastened together by a saddle-stitch which passes through the spine fold. Wire stitches may be used in the same inset style, or they may be driven through the side of the sections near the spine fold, the sections being side by side as for sewing. This side-stitched method prevents the book

from opening flat and necessitates extra space in the back margins. Sidestitching can pass through or under the limp cover.

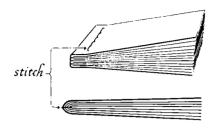


FIGURE 75. Side-stitching (above) and saddle-stitching.

Sewing, rounding, backing, and lining can all be dispensed with in the unsewn or 'perfect' methods of binding. The sections are gathered, collated, and cut in the ordinary way, and the glue is then applied to the cut edges instead of the folded edges of the pages. The glued edges form a flexible back, and the folded edges are cut to form the fore-edge of the book.

The Flexiback method of binding is based on sewn sections, but the glued back is strengthened by a single application of stout linen, which replaces the usual double lining and the mull as well. This method strengthens the adhesion of the text to the case, and enables it to withstand treatment that might break the back of an ordinary binding; but thick or heavy books tend to keep their shape better when stiffened with the conventional double-lining. The Flexiback process can be combined with unsewn techniques.

Spiral and plastic methods are based on metal spirals or plastic grippers which pierce the pages to hold them together; they represent a conspicuous break with convention, since the mechanism of the spine obtrudes into every opening. Their most striking advantage is that plates can without difficulty be secured anywhere in the book. Both unsewn and spiral methods have the virtue of allowing the book to open perfectly flat, and the drawback that librarians cannot usually rebind the book economically by conventional sewing methods.

The case can be replaced by limp covers, whether of paper or cloth. Paper is in fact the better material for this style, since it is cheaper and its strength is adequate for the purpose. (Conversely, cloth, but not paper, is better for case binding, when greater tensile strength is needed.) Limp covers are those which are not stiffened by a board, and they need as much stiffness of their own as may be consistent with price and with flat opening.

The simplest form of limp binding is the inset and cut-flush style, in which cover and text are secured to each other by stitches and are then all cut together.

If, on the other hand, the sections are continuous in the usual way, and are sewn and glued or stitched before covering, the limp cover, already

creased to fit round the spine, can be glued on the inside of the spine and a little way on to the inside of the front and back cover, and can then be placed round the text before text and cover are cut together. This style of drawn-on cover can be placed on the book by machine. The cutting of text and cover together is one of the economic advantages of limp binding, and although the flush cover gives little protection to the edges, it offers a considerable reduction in price. The drawn-on covers are, of course, insecurely fixed to the text, but if handled with reasonable care will survive a number of readings.

A stronger form of limp binding is that in which the limp covers are fully pasted down to the text. Endpapers are something of a luxury here; the outermost leaves of text can equally well be pasted to the cover. The cover is not likely to come away. The drawback of the style at present is that since no machine has been designed to insert the text into a fully pasted cover this work has usually to be done by hand, with a consequent increase in price. The text can, of course, be inserted into the cover on a casing-in machine if the cover is not pasted to the spine, and there is in fact little advantage in fixing spine and cover together if the cover is firmly secured to the text by other means.

Most limp styles of binding can be carried out with overlapping covers, which although they give the book a less neat and solid appearance provide more protection to its edges and corners.

Other variants on conventional styles of binding are much too numerous to describe. Any designer who can understand the economics of binding methods and materials, as well as the mechanism of the finished book, can invent a style to suit his own purposes, but is likely to find it has been used before. Here, as in other forms of binding, material and construction need to be related to each other; the purpose of such deviations from the customary cloth boards is economy, and the use of any method or material better than it need be for the purpose is uneconomical.

Part of the designer's task is to find for every book a form in which it can be not only used but afforded. Substantial economies in composition and printing are very difficult to effect, so that paper and binding tend to be reduced in quality in order to reduce the production cost of the book. If the devotion of the British public to cloth boards for all purposes, already weakened by Tauchnitz Editions, Penguin Books, and others, can be shaken loose in regard to books of ephemeral value such as light novels whose interest will not outlast a train journey, the majority of people may cease to regard books as either unnecessary or something to be borrowed

rather than possessed. The style of the book's construction, and hence its price, should be consistent with its purpose. The designer should at the same time urge the publisher to reduce the production cost of ephemeral work, and suggest the use of better paper, heavier boards, and stouter cloth for books of lasting value. True economy is not parsimony but a right disposition of expense.

BOOKS

- CARTER, JOHN Publishers' cloth: an outline history of publishers' binding in England, 1820-1900 (Aspects of book-collecting) - Constable, 1935 - 16mo: pamphlet.
- COCKERELL, DOUGLAS Bookbinding and the care of books: a text-book for bookbinders and librarians (The artistic crafts series of technical handbooks) Pitman, 4th edition, 1925 illustrations. [Hand binding only.]
- CONSTRUCTION Book construction Library Association, 1931 pamphlet: bibliography. [Deals with the durability of books.]
- DIEHL, EDITH Bookbinding: its background and technique (2 volumes) New York, 1946 illustrations: bibliography. [Mainly concerned with hand binding.]
- MASON, JOHN Edition case binding P T & P 23, 1946.
- SADLEIR, MICHAEL The evolution of publishers' binding styles, 1770-1900 (Bibliographia: studies in book history and book structure, 1780-1900) Constable, 1930 illustrations.
- VAUGHAN, ALEX. J Modern bookbinding: a treatise covering both letterpress and stationery branches of the trade, with a section on finishing and design Leicester, Raithby Lawrence, 1946 illustrations.
- See also, after chapter 1, JENNETT and SIMON; after chapter 5, WHETTON; and, in § 241, HOBSON.

The jacket

The jacket of a book is the loose paper wrapper placed round its covers by the binder. The original purpose of the jacket was to protect the cover before sale against handling and exposure to light and atmosphere, and the jacket is still sometimes referred to as the dust-wrapper. Since any unprinted jacket, unless it is transparent, conceals the identity of the book, the title, with at least the names of author and publisher, usually appears on its front and spine, and in fact the identity of the book can be made more obvious by the use on the jacket of bigger lettering than might be considered seemly on the cover. This emphasis on the book's identity has developed into the most lavish form of advertisement used by the book trade, and the jacket has been aptly described as a poster wrapped round a commodity.¹

The purely protective jacket, usually consisting of a plain piece of cheap paper, is still used for books which are not intended for sale in bookshops. Transparent jackets are sometimes placed round books whose attractive covers and clear lettering undertake the identifying and advertising functions of the jacket. A common fault with such jackets is an exasperating flimsiness and inadequate transparency. Transparent jackets may, of course, be printed, if the cover of the book is attractive but not clearly lettered.

An effective jacket displays on its front the name of the book and of its author in letters clear enough to be read at a distance of not less than eight or ten feet; this is approximately the distance from the back of a bookstall or bookshop window to the eye of a passer-by. The spine of the jacket does not usually allow of such generous display, but here the lettering should be large enough to be read even when the book is on the highest or the lowest shelf in the shop.²

The place for advertisement in book design is the jacket, and only the jacket. A well-designed and well-made book is its own advertisement; its binding and text do not need that touch of the remarkable—the bright colours, for instance, and large bold types in striking arrangements—which thrusts forward a message rather than offers it. Advertising devices,

¹ CHARLES ROSNER: The book jacket: first principles (Penrose, 1952).

² '... no customer will look at a book lower down than three feet or higher than about eight.'

B. N. LANGDON-DAVIES: The practice of bookselling (Phoenix House, 1951).

designed to catch attention rather than to hold it for long, become tiresome in a book which may be owned for years and read or referred to over and over again. The typography of the advertisement has had its effect upon that of the book, and book-designers are beginning to place display lines away from the centre of the text area, and in other ways to free themselves from the minor conventions of bookwork. To admit this influence, however, is not to suggest that the purposes of book design and advertising are the same, or that the same styles are suitable for both. So long as this difference of purpose is borne in mind, it is safe to point out that advertising has its place in book design, and that the typographer may, in designing the jacket, do well to use an emphasis of style from which he has restrained himself in planning the book.

The style of a jacket is more limited by the nature of the book than the style of a poster on a hoarding is limited by its environment or its subject. The appearance of a jacket must conform to some extent with that of the book it covers, since the two are offered for sale together; and for the same reason, the style of the jacket must suggest nothing that the book does not fulfil—the advertisement and the commodity are close enough to each other for comparison.

The style of the jacket depends to some extent on the policy of the publisher. Some publishers like the jackets of their books to have a family resemblance which implicitly reminds the reader of the publisher's identity. This naturally limits the quality of jacket design and the harmony between the style of the jacket and that of the book. Also by means of a family resemblance, a jacket may be intended to advertise the author, or the series of which the book is a part.

§207 · DISPLAY LINES AND TEXT

The words displayed on the jacket sometimes appear in drawn lettering instead of in type. The advantages of type are precision of form and low cost; those of lettering, freedom of style from the established designs available to every other jacket designer, and freedom of proportion (figure 84, page 388). Whatever the extent of the displayed words, they can be shown in the maximum width and height if the letters are drawn; the width of type, fixed in proportion to its height, often prevents the use of a very large fount. Drawn lettering can also be designed to suit the nature of the book, if no allusive type is available. Only a small number of display types have the boldness, the individuality or grace of form, and the economy of set which are the most useful qualities in letters for the jacket.

However fancifully drawn or set, the display lines must be capable of being read without difficulty at some distance. The principles of legibility suggested in §§ 36 and 82 apply to jackets as to display composition in the text; thickness of stroke and size of counter, for instance, should be in proportion to each other, and the lines of type or lettering not too close to each other. So long as these requirements are met, the larger and bolder the letters the more legible they will be at a distance.

Legibility in jackets is complicated by the use of colours and of illustrations. Letters printed in pale colours are clear only if their background is dark. Since ink is not usually quite opaque, arrangements of this kind usually necessitate reversing from black to white; reversed letters can appear to be even clearer than letters printed positively in the usual way. Conversely, letters in dark colours are clearest on light-coloured backgrounds. Where part of a display line appears on a light background and part on a dark one, one part of the line may be printed in positive and the other reversed. A background broken up with different strokes and colours can make almost any lettering illegible. If care is used, however, picture and words can be successfully combined. The words, for instance, may appear in an area of plain light colour such as the sky, or in a plain panel fitted into, or part of, the picture.

The text on the front of the jacket is usually set horizontally, or nearly so; when the book lies flat on a table, or stands face outwards on a shelf, the words can be read with ease. The spine presents rather more of a problem. Text turned on its side to read up or down the spine can always be printed in bigger letters than text which runs across the spine, and size in the letters is more important on the jacket than on the cover. Larger letters, even when turned on their sides, are easier to read at a distance than small letters arranged horizontally. When choosing between arranging the letters to read up or down the spine, the typographer may do well to bear in mind the considerations mentioned in § 202.

The relative emphasis of the words displayed on the jacket is not always a matter to be decided by the designer; the publisher or his advertising manager may have to be consulted. The name of the author is sometimes considered to require more emphasis than the title of his book, and in the title itself one or two words may need to be emphasized at the expense of the rest. In jacket design, variations of emphasis can be obtained not only by differences of size, weight, and spacing in the letters, but by differences of colour in both letter and background; a less important word, on a two-colour jacket, for instance, may be printed in maroon on grey, a more important word reversed in white on maroon.

Since the spine and front of the jacket are often visible at the same time, the display lines which appear on them may well be designed to align horizontally with each other; the topmost line on spine and front, for instance, may begin at the same height. If no advertising material is to appear on the back of the jacket, a repetition of the front display there may be preferable to leaving the back blank. If lettering is kept at least \(\frac{1}{8}'' \) from the fore-edge and trimmed edge and from each side of the corners of the spine, there should be no risk that any slight error of position in jacketing will cause the letters to disappear over the edge of its proper surface.

The series jacket, which with alterations is used for a whole series, can be designed economically by restricting the use of blocks to those parts of the display which are common to all books in the series. The series title, for example, may be printed in reversed lettering on a tint panel, over another part of which the book title is printed from type in a darker colour. Blocks are best not used for the spine, which may vary in thickness from book to book (figure 84, page 389).

The text of the jacket, which usually consists of advertising matter, should be treated with the same care as the display, and may benefit from being arranged as part of the same design. The blurb—the description of book and author, usually set on the front flap and if necessary on the back as well—and the list of books usually on the back of the jacket may, for instance, be aligned at the head with the display lines on the front and spine, and may be set in the same series and printed in the same colour. If a list of books is planned to be printed by letterpress in the same colour as very large solids on the front, the printer may have to use two workings, one for the type and one for the solid, in order to avoid over-inking the type.

The main fault of most jacket text is overcrowding; an attractive setting is impossible if too much copy is supplied. The blurb is best written to fit on the front flap alone; not every reader's enthusiasm for blurbs will send him hunting for the completion at the back. There must also be room for the price and terms of publication on the front flap. Victor Gollancz has made brilliant use of a provocatively written blurb displayed on the front of the jacket, and other publishers sometimes print favourable comments by reviewers in the same position.

The name of the artist or designer and of the printer should appear on every creditable jacket. The standard of jacket design and production will improve if all can see where the best work is done. Since there is usually room on one of the flaps, there is no need for the artist's name to appear on the front.

§ 208 · ORNAMENT AND ILLUSTRATION

Every kind of printed decoration is available to the jacket designer; there are innumerable kinds of ornamental type and drawn lettering, fleurons,

other typographic ornaments, and drawn decoration, together with a number of autographic and photographic techniques, which can be combined with each other and with colours chosen from an infinite variety. The technical aspects of the various forms of decoration and of the different techniques have been considered in earlier chapters; skill in combining them is a matter of practice and creative imagination rather than of principle; and the choice of colours is primarily a matter of taste. The different manners of decorating a jacket, therefore, are not detailed in this section, and indeed they could hardly be fitted into a book. The few points raised here are some of those which limit the designer's choice among ornamental materials, styles, and colours.

Coloured paper and coloured ink can be combined even in the cheapest jacket. The colours of paper and print should suit not only each other but the subject and appearance of the book within. This is partly because the head and tail edges of the cover can be seen even when the jacket is on, and partly because the discriminating buyer of books, on removing the jacket to look at the cover, sees the two very nearly simultaneously. Any discord of colour between jacket and cover will therefore be obvious. An unsuccessful attempt at a close match is also likely to be an unpleasant sight. Matching the colours of dissimilar surfaces such as paper, whether plain or printed, and cloth is always difficult, and different but compatible colours are more likely to be successful.

Since the jacket is to be seen from some distance, and is to appear in the bookshop among many other jackets, the best colours (at least for books intended to be popular) are rather strong and bright, and combinations of colours gain from pronounced contrast. Delicate tints are best used in fairly large areas, as background to lettering and ornament in stronger colours.

As a rule, light colours do not show up well when printed over a dark background unless silk-screen is used; otherwise, reversing is preferable. Type and ornaments for reversing should be carefully chosen. Any fine detail tends to close up in engraving or printing or both; sharp serifs and hair-lines, for instance, may partly or wholly disappear, so that old face types as a rule are more effective than modern. Bold types are better if the printing is to be in a fairly light colour, since the lighter colour will be emphasized by area instead of by contrast in shade.

The mainly typographic jacket, or at least that which does not rely primarily on a picture, is often the most attractive. Letters, combining the effect of pattern with the function of communication, have a simple force which is well suited to the jacket's needs. In a competing variety of jackets, those which stand out as conspicuously handsome often have type or lettering as their only ornament.

Illustration, however, is very widely used on jackets, and for those types of book which rely mainly on casual sales it is almost obligatory. The most pleasant and, as it happens, the cheapest style is the use of flat colour, perhaps relieved by mechanical or other stipples. This gives the colours the clarity and contrast which are effective among less forceful rivals, and when seen at a distance. Continuous colour, on the other hand, has the advantage in the variety of shades it can reproduce. The jacket design of an illustrated book is often based on one of the text illustrations; it may be specially drawn by the illustrator, and perhaps reproduced by the same means as the text illustrations. Perhaps the best jacket for an illustrated book is one which serves as an introduction to, or sample of, the illustrations within, so that a photograph may well be used in the jacket of a book illustrated with photographs. If the book is not illustrated the jacket illustration should be appropriate to the text; the artist should be supplied with a copy of the book in typescript or in proof, and required to conform with it as far as possible in both letter and spirit.

Since a jacket needs to be distinct from its neighbours, simplicity, clarity, and force are among the prime virtues of any illustration that is to appear on it. Garishness may discourage the reader from wishing to own the book inside such a jacket.

Jacket illustrations are often costly, and when they deserve such treatment they sometimes appear inside as well as outside the book, as endpapers, frontispiece, or even title-page. A particularly attractive form of jacket illustration is that which covers the whole visible area, back as well as spine and front, except perhaps for small panels of lettering; this kind of treatment encourages the bookseller to display the book opened to show front and back (figure 84, page 389).

§209 ⋅ PRODUCTION

The dimensions of the jacket cannot, of course, be settled until the thickness of the book is known. As a result, the jacket cannot always be printed until a late stage in production; the *precise* thickness cannot be ascertained without binding up a set of printed sheets. This may cause delays, particularly if the jacket is to be printed in full colour, or by offset. After the jacket has been printed, the book may be reprinted on a different paper which produces a slightly different thickness. The best jacket designs, then, are those which allow some latitude for variations of thickness. Centred display lines on the front and spine of the jacket, for instance, have to be adjusted laterally for every change of thickness; but if the spine lettering can be aligned at a fixed distance to the left of the edge between front and spine, and the front lettering similarly aligned to the right of the

same join, their positions on the spine and front will remain constant in relation to that edge whatever the thickness. If a list of books is printed on the back of the jacket, an increase of thickness will draw the list closer to the spine; the use of an off-centre style with plenty of space to the left and right of the list may prevent variations of this kind from looking uncomfortable. Designers, however, are naturally unwilling to be restricted to such a style, which may be useful only when the printing of the jacket has to be put in hand at a comparatively early stage.

The precise size of the binding case is not certain until the cases are made. In order to assure a perfect fit, jackets should be supplied to the binder with a little extra depth to be cut off, and instructions should be given, if necessary, about cutting at head or tail or both.

Generous flaps at back and front prevent the jacket from falling off every time the book is opened. Between two-thirds and three-quarters of the width of the board is ample, and this will allow the blurb to be set in a reasonably wide measure. Most flaps are too narrow to be satisfactory.

There is room for initiative in the choice of paper for the jacket, so long as the design is suited to the paper and the functions of the jacket are kept in mind. In advertisement value, unusual texture and colour in jacket paper can equal a good design. When a distinctive paper is used for the jacket it sometimes reappears in the book as endpapers.

The thickness of the paper is usually governed by the size, weight, cost, and importance of the book. A large and heavy book needs a fairly stout jacket, since it may tend to fall out of a flimsy one; but as the jacket will also have to be large, thick paper may substantially increase the cost. A thin jacket is apt to seem shoddy on an expensive or important book, and the extra cost of thick paper can usually be afforded for such books.

Whatever the outer surface of the paper, it needs to be fairly rough on the inner side in order to grip the cover. If art paper is to be used, for instance, one-sided art is both cheaper and more effective than two-sided. Art paper is not ideal for jackets, because of its sensitivity to damp and to becoming marked when handled, and its tendency to crack along a fold. When it has to be used, flaking of the coating will be less obvious if nothing is printed over the folds of the jacket at the fore-edges and along the spine.

Of the various processes used for jacket printing, letterpress is predominant as usually the cheapest and often the most effective, particularly when there is no half-tone in the design. When continuous-tone is necessary, offset is perhaps the most attractive process, since cartridge paper is particularly suitable for jackets. Gravure is used for jackets comparatively rarely, probably because the printed surface tends to be slightly unpleasant to touch. Silk-screen is particularly well suited to jacket work, because of its very bright, clear colours, and because the paint or ink used with the

process can be opaque enough to print in a light colour on a dark background. If a thick paint or ink is used, it may flake if printed over a fold of the jacket, and may also deteriorate with handling.

A shiny surface in text or illustration is a fault, but some jackets gain from being varnished or laminated. Lamination provides a surface which in spite of its glossiness is more pleasant to touch than art paper and ink, and which not only resists dirt from the atmosphere and handling, but can easily be cleaned. It adds strength and stiffness to the jacket, and brightens the colours of the printing by increasing the reflection range of the surface. The coating can be laid over the whole jacket or part of the jacket.

A conscientious binder usually folds the jacket once, often along one of the fore-edges, in order to ensure accuracy of position when the jackets are placed on the book. So long as the position of the jacket is obvious, as it is for instance when the spine display lines are centred, the binder should be able to fix position reliably. If, on the other hand, nothing in the design is centred, the typographer may do well to indicate on a printed jacket the approximate position of one of the folds.

§210 · BOXES

Boxes, or slip-cases, are rarely used except for costly single books or for sets of books, and if they are necessary they should be designed as carefully as the jacket. They consist usually of a one-piece box, similar in size to the book, and open at the side which corresponds to the spine. The book is inserted fore-edge first, so that the spine remains visible in the open side of the box.

Thick boards do not increase the strength of the box as much as does a stout covering material, since the strain falls on the corners and edges rather than on the sides. The boards should be lined on the inside, perhaps with a coloured or printed paper. When it can be afforded, cloth makes a handsome and durable cover for the box. More often, however, paper is used; the paper should be strong and pleasant in colour and texture, since, unlike the jacket, the slip-case is intended to be kept with the book. For the same reason, the advertising function of the jacket should not be transferred to the box.

Since the spine of the book can be seen in the slip-case, the title of the book does not have to appear on the box. If, however, it is printed on the closed fore-edge side of the box, the box can be kept with the closed side outwards, so that the spine of the book is less exposed to light and dust. Display lines can be placed on the box by pasting on a printed label, or by printing the cover before the box is made.

The life of the slip-case will be prolonged by finger-holes cut in both

sides of the opening, since there will then be no need to force the edges apart in order to get the book out.

The book jacket is sometimes attacked for being expensive out of all proportion to its usefulness; the attack is usually directed in particular at jackets illustrated in continuous colour, and takes the form of pointing out that by doing away with the jacket, which is ephemeral, the publisher could substantially improve the physical qualities of the book, which are more or less permanent. Any commodity could be improved by reducing expense on advertising and proportionately increasing that on manufacture. Those in favour of advertising point out that it increases sales and thus keeps prices down, so that to cut advertising may result in rising prices. Even those not in favour of advertising admit that most industries advertise in proportion to their need to stimulate sales which might not otherwise take place, and that the book trade needs to stimulate sales, but spends comparatively little on jackets and advertising combined. So long as the expensive jacket is considered to be a form of advertising rather than a part of the book itself, its cost can be justified.

In the same way, when jackets are recognized as advertisements, the typographer can see the dangers of combining the jacket with the cover of the book. A jacket design can quite easily be printed on the cover, but by no means all designs are likely to please the reader for as long as he owns the book. The jacket and the cover have quite different purposes, and require different styles.

BOOKS

ROSNER, CHARLES - The art of the book jacket - HMSO, for the Victoria and Albert Museum, 1949 - pamphlet. [Published on the occasion of an exhibition of jackets at the museum.]

See also, after chapter 1, JENNETT and SIMON; and, in § 240, ROSNER.

Casting off

To cast off a typescript is to calculate the number of printed pages it will occupy in a style which has already been planned. An accurate cast-off cannot be undertaken until the book has been designed in some detail. On the other hand, before beginning to plan his text page, the typographer should have some idea of the number of words he will need to fit into it. To prepare elaborate specifications for a book intended for the pocket, for instance, would be a waste of time unless some care were taken to prevent the text from filling so many pages that the book would be too thick for the pocket. The vaguest idea of the number of words to appear on each printed page may be enough, but some idea there must be. Once the design is complete, its effect on the length of the printed book can be worked out.

The process of casting off falls into three parts. The first of these is calculation of the number of words or characters in the typescript; the second is calculation of the number of words or characters in the printed page; and the third is comparison of the content of the typescript folio with that of the printed page in order to work out the extent of a particular book.

Any kind of cast-off should be based if possible on the number of ens rather than the number of words in the typescript folio or printed page. An en, for this purpose, may be defined as one letter, one space, one punctuation mark, one figure—anything in the typescript to produce which the carriage of the typewriter had to move onwards one space.

The number of ens is more reliable than the number of words because one text may consist of words of greater average length than another—compare, for instance, an advanced book on chemistry with a reader for young children. It is usual to assume that the average English word consists of five ens, and that the space between words is roughly equal to a sixth; six ens are therefore allowed for each word. An extensive character-count of a very wide variety of literature¹ has however shown that the

¹ By a statistical sub-committee of the Costing Committee of the Master Printers' Federation. The committee issued a circular in 1923 which stated that the average revealed by this count was 4:24 (*The Monotype keyboard operator's manual*).

average number of letters is nearer $4\frac{1}{4}$ than 5. In the first paragraph of this chapter, for instance, the average length of words is almost exactly $4\frac{1}{5}$ ens, excluding spaces and punctuation. In any case, it is essential to eradicate from the beginning the possibility of any major inaccuracy, since minor inaccuracies are in any case likely to accumulate in any but a really careful reckoning.

A really accurate cast-off for all books, even the most complicated, is vital to the book-printer. The error in a printer's cast-off should be less than 1 per cent. Precision of this kind is within reach only of the most painstaking approach, based perhaps on counting (or on measuring)¹ the ens in the typescript and comparing with a specimen setting of a typical passage in the proposed style. Time and trouble is well spent here, since accurate casting off is the foundation of reliable estimating. The typographer can, if he has the time, cast off with equal accuracy, but precise casting off may not be considered essential in the planning stage, unless the book is to be fitted into a whole number of sections.

§211 · APPROXIMATE CASTING OFF

A rough cast-off is better than none, and there will often be times when the typographer is able to carry out nothing better.

'Good copy' is set out in such a manner that its en-content can be calculated with reasonable accuracy by averaging; it includes, for instance, copy typed in the style described in § 1, or copy set up in type. The number of ens per full line, and the number of lines per full folio of copy, are even, or very nearly so, throughout. Handwriting rarely makes good copy. 'Bad copy' is set out in such a manner that its en-content cannot be calculated with reasonable accuracy by averaging; it may be typewritten, but on several different machines which have letters of unequal width, with lines of varying length, with no consistent spacing between lines, and with an uneven number of lines to the folio. More often, bad copy is handwritten in an uneven manner.

The typographer will rarely have time to make an accurate cast-off of bad copy, but will probably leave it to the printer, who will have to make one anyway. The designer's cast-off will have to be based on a fairly approximate calculation of the number of words in the copy; he must work this out as best he can by averaging, unless he feels he has time to count the words. Having achieved a total, he can convert it to en-content by working out the approximate average number of ens per word and multiplying that number by the total number of words. In working out the number of words in bad copy, common sense and practice are better guides than technical knowledge.

¹ Most typewriters produce ten characters to the inch, some produce twelve.

There are various ways of calculating the en-content of good copy. For an approximate cast-off an approximate calculation is good enough. The average number of ens per line of copy may be found either by counting the ens in a few typical lines; or by drawing a vertical line down the right-hand edge of the page through what appears to be the end of the average lines, and counting the ens to the left of this line. The number of lines on the full folio should be multiplied by the average number of ens per line to give the average en-content per folio of copy. The short folios—such as the first and last of a chapter may be—should be converted to fractions of a folio, and added to the total of full folios. The average number of ens per line, multiplied by the number of lines per full folio, multiplied by the total number of folios, will then be the approximate en-content of the copy. It may be assumed that short lines in the copy will be balanced by short lines in type.

Any part of the copy which is to be set in a style different from that of the main text should, of course, be cast-off separately.

Each chapter may, of course, be calculated separately. This takes very little extra time, and leads to greater accuracy, particularly when each chapter is to begin a new page.

The next stage is to calculate the number of ens in the printed page. Here technical skill must be added to common sense. The number of lines of text on the full type-page is already known; the average number of ens per line needs careful working out. If a setting similar to that planned for the book—that is, a setting of the same fount in the same measure, the text being similar in style—is within reach, the en-content of the line may be found by averaging; this is the most reliable method. Casting-off tables are available for use with the various composing machines; these are better than nothing, but are purely arithmetical and should be treated with reserve. They cannot, naturally, allow for an unusually high proportion of capital letters, or for the extra wide spacing that may result from long words in a narrow measure, or for any of the variables that may influence the en-content of the line.

There is also a formula which has had authoritative recommendation but which is not the more reliable for that. For Monotype setting the measure, expressed in points instead of in picas, is divided by the set of the fount to give an *em*-content of the line; this is converted to ens when multiplied by 2. For Linotype setting the em-content is calculated by multiplying the points in the measure by 26 (the number of letters in the alphabet) and dividing by the point size of the fount multiplied by the width in pica ens of its lower-case alphabet. The fallacy in the formula suggested for Monotype setting is to use the set as an indication of average

¹ Sec, for instance, COPY-FITTING, page 362 below.

width, when the set is the width in points of the widest characters only. According to Scientific copyfitting, 12-point Centaur and 12-point Gill Sans, both 11\frac{1}{4} set, if set solid in a type area of 20 picas wide by 25 picas deep, would make 157 and 177 pages respectively of 200,000 ens. The weakness of both formulae is that no text consists of an equal number of each lower-case letter; for instance, after e, two of the most common letters in English setting are t and i, both particularly narrow letters. Calculations in Scientific copyfitting suggest that the average width of lower-case letters is 8.9 units, or slightly narrower than an en of 9 units; in English composition, however, the letters are used in such proportions that their average width is about 8.3 units.

Once the approximate en-content of the copy and of the type-page are known, the latter can be divided into the former to give the number of pages of type. This must, of course, be adjusted by separate calculations of matter set in different styles, such as extensive footnotes, and particularly by separate calculation of the extent of preliminary and back pages, of illustrations and of any other extra matter. If the chapters are to begin on new pages but have not been calculated separately, half a page per chapter is a reasonable amount to add, unless the style of chapter heads is unusually lavish. If the chapters are to run on the amount per chapter to add will, of course, depend on the space between the text of the chapters.

§212 · ACCURATE CASTING OFF

Different printers use different methods of casting off, and one effective way of learning a reliable method is to see whose casting off is the most consistently accurate, even for difficult books, and to ask the printer how he does it. Whatever the method, it is almost certain to be based on a specimen setting of a typical passage from the book in production. If the designer cannot lay hands on a setting reasonably typical of the book in hand, in which the same fount is used in the same measure, he should do the best he can by the means already described, and treat his estimate as approximate. This is better than preparing a calculation which is almost certain to be inaccurate to some degree, and relying upon it as though it were exact.

If a suitable specimen setting is available, perhaps in another book or in a printer's specimen book, the average en-content of the type-lines can be worked out; the more lines counted the better.

It is in the comparison between copy and type that methods differ. Whatever the method, accurate casting off is a laborious business; there is no short cut. One of the simplest, and perhaps the most effective, systems is to measure on the copy the width occupied by the number of ens

¹ page 362.

in the average type line. A strip of card is then cut to this length, and used to divide the copy up, paragraph by paragraph, into lines of type.

Some kinds of copy lend themselves to this method, and defy any other. One particularly difficult subject is the novel in which paragraphs of ordinary length are interrupted by passages of brief exchanges of conversation, each speech occupying less than a line. This can neither be cast-off throughout by an approximate method based on averaging, nor counted up as a total of lines; the cast-off must be based either on guess-work, on a combination of two methods, or on precise measurement.

Verse can be cast-off very accurately indeed without much trouble. If the format and text of the book are designed to accommodate the longest line, the lines can simply be counted up and allowance made for the space between poems and between stanzas. In a collection of short poems, the copy may have to be equated with type-pages folio by folio, because of the uneven spacing necessary to prevent a poem being broken ineptly between two pages. If the measure is too narrow to accommodate the longest line, these lines can be identified by the measurement method.

§213 · MAKING A FIT

An eight-crown press prints 128 pages of a crown 8vo book on a full-size sheet, 64 pages on each side. A book of 256 pages, then, may be printed on two eight-crown sheets. If the book contains a further 64 pages, these can be arranged in a work-and-turn imposition for printing on a sheet of the same size.

An extra 32 pages will begin to complicate the printing. For a very long run, to prepare duplicate pages of type or two sets of duplicate plates may be worth while, to print the forme 'two-up' as 64 pages. More usually, the 32 pages will be printed work-and-turn on a quad-crown press; the cost of printing in quad size is higher per page than that of printing in double-quad size, but the bed of the larger press cannot be filled by the small forme.

An extra 16 will make matters a good deal worse. Even in a work-and-turn imposition, these pages will probably be printed on a double-crown press, which is more expensive still per page than quad-crown printing. Moreover, if the book is to be bound in sections of 32 pages, the section of 16 pages will add almost as much to the binding cost as will a section of 32. Oddments of 8 and 4 pages will be even more costly per page.

When double-quad presses are used for octavo books, then, any sheet of less than 64 pages increases the cost per page of printing, and has to be considered as an oddment. With quad presses, anything less than 32 pages is an oddment. Any oddment which contains fewer pages than the number of pages per section increases the cost per page of binding, and may also slightly

weaken the construction of the book. Double-quad presses are usually used for longer runs, for instance over 5,000, quad presses for shorter.

Ideally, books should always be so designed and, if possible, so adjusted in preparation, that the whole text can be printed on full-size sheets. Often, however—indeed usually—this is extremely difficult to achieve. After the whole text is in type, alterations to the preliminary pages, new appendixes, an index of unexpected length, or any one of many unforeseen chances, may alter the extent of the book. In any case, the typographer would have to cast the book off very accurately indeed if his design were to fit it exactly into an even working. Diligence and determination on the part of the typographer, the printer's estimating or editorial department, the publisher, and sometimes the author can, however, bring about an exact fit. The problem, in the initial stages of design, is to decide whether it is possible to aim at fitting, and, if it is, whether it is worth while.

Certain authors habitually rewrite extensively when the book is in proof. Technical or scholarly works, or highly topical ones, are likely to require additions and deletions, sometimes quite extensive, during all stages until the formes actually go into the press-room. If a set style has to be adhered to, the designer has little opportunity of manœuvring the extent one way or the other. For books of this kind, an even working is unlikely to be achieved except by chance.

When the book is a very long one, the extra cost of an oddment may add so small a percentage to the cost of printing and binding as to be negligible. If the run is short, the extra cost may not mount up to a considerable sum. When large numbers of a book of short or medium length are to be printed, some attempt at a fitting should usually be made.

Against the extra cost of printing and binding oddments, and the possible weakening of the binding by sections of uneven size, the typographer must balance the cost of the extra work involved in making a fit, and the danger of spoiling the page design.

If the book is to be fitted into an even working, the first step will usually be to calculate as closely as possible the en-content of the copy. A very rough idea of the design of the text page is then worked out, to show the approximate en-content of the type page. Division of the type-page encontent into that of the copy, adjusted as usual for preliminary pages and other variables, will give an approximate extent for the book. If an extent giving an even working, and near to this approximate extent, is chosen, the design of the text-page can be altered until its en-content fits the copy into the even working.

It is always best to aim at an extent slightly below the even working; even half a page over will make an oddment, but three or four blank pages, if the extent is slightly under a fit, do no harm at all.

Estimating

An estimate is a forecast of the cost of work or of material or both; the cost may be anything from that of a single item—such as the paper, or the preparation of original illustrations—to that of the whole edition. The physical quality of any book is limited by the highest price at which it can be sold. In almost all modern book design, therefore, the approximate cost of each process has to be borne in mind as it is planned, and that of every kind of material as it is chosen or specified. When a choice has to be made between processes or materials, a comparison of the approximate costs may settle the matter outright. Reasonably accurate preliminary estimates enable the typographer to complete his design before sending copy to the printer. The design may otherwise have to be altered in detail after the printer has received his instructions and submitted his estimate, and alterations at this stage may well impair the adjustment of all parts of the design to each other.

Estimates differ in form according to their purpose. In its simplest form, an estimate may be nothing more than one or two easy calculations, intended to show, for instance, the approximate difference in cost between two kinds of paper. When, perhaps with the help of several calculations of this kind, the typographer has completed his design, he will often do well to work out an approximate comprehensive estimate for the edition, in order to see whether his design is economically practicable. There may be no need for much calculation; if for example the design does not deviate far from that of books previously produced, a cast-off and a proportionate adjustment of costs according to extent may be enough. When this approximate estimate has proved the economic possibility of the typographer's plans, the copy can go to the printer. It is usually accompanied by a request for an estimate and cast-off in the planned style; this serves as an essential check on the typographer's calculations, limits the publisher's liability for production expenditure, and gives a clear guide to the published price of the book. This authoritative estimate, based on the printer's survey of the copy, should confirm the preliminary calculations.

A comprehensive estimate of the production costs of an edition is achieved by first calculating the total cost of the edition, and then dividing

the total by the number of books in the edition to show the cost per copy. A typographer who has prepared a detailed plan usually expects a detailed estimate; that is, a bald statement by the printer that the total cost or cost per copy of composition and printing will be a certain sum is not considered enough, since it gives no indication of points at which economy or further expenditure may be possible.

The set of prices which make up the estimate may come from various sources. Most book printers supply to their customers a scale of charges for letterpress printing, and usually charge in accordance with these scales, although the actual cost to the printer of printing certain kinds of work, with the addition of his overheads and profit, may fall below or rise above these rates. Certain other processes, such as block-making, are or may be subject to scale rates. Individual estimates are usually necessary for processes such as composition in which the work entailed may vary greatly from book to book; some printers do submit composition scales, but these are to be regarded as a basis for calculation rather than as a definite commitment. The cost of material can usually be estimated according to the prices of the day; great care may be necessary here if prices are fluctuating. Yet another source of information for an estimate may be comparison with previous work; this is often used to check estimates previously submitted by manufacturing firms. Comparison may also provide some figures which might not otherwise be available. The printer's cast-off, for example, states no more than the provisional extent of the book, and the typographer will usually prefer not to ask a binder for an estimate until the extent is definitely known, in order to avoid estimating more than once; the binding price in the initial estimate may therefore be based on comparison with previous charges for similar books.

The two vital qualities of the calculation are comprehensiveness and accuracy. A single forgotten item may ruin an estimate, and, since there is usually much to remember, a printed form on which the various items are listed may be useful. Everything that the publisher will count as a production cost must be included, and what constitutes a production cost varies from firm to firm. Errors are always apt to appear in estimates, not only in the arithmetic but in the translation of the design into costs; double-quad paper, for example, tends to be calculated at the ream-weight of quad paper by an estimator unaccustomed to double-quad. Such errors can be avoided with certainty only by an independent check, in which the same estimate is separately calculated by another person.

§214 · DIFFERENT KINDS OF COST

The unit cost may be defined as that part of the cost per copy which the publisher takes into account for the purpose of calculating the publication price of the book. The publisher's method of translating the total production cost of the edition into unit cost has some bearing on the design of the book. For example, the composition cost of an educational book intended to be reprinted a number of times is ignored by some publishers

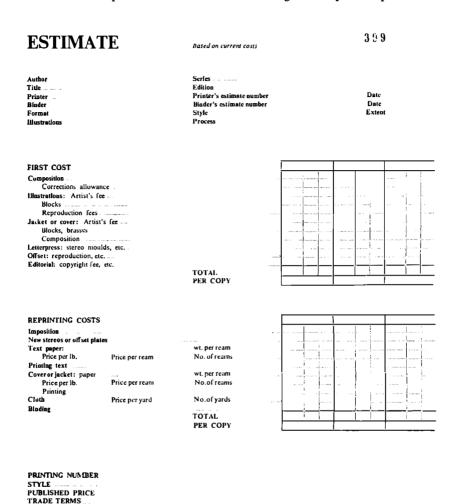


FIGURE 76. An estimating form designed for a certain type of educational books in which first costs are usually considered separately from running costs.

when the unit cost is being calculated; the cost so ignored is, when divided among the total number of copies that are likely to be printed, too small to be worth taking into account. This enables a long book to be published at a comparatively low price, and may also encourage the typographer to specify a style of composition that will be clear and convenient to the

reader rather than economical. A book of which only one impression can be foreseen with certainty, on the other hand, will have to recover the whole cost of composition in that impression, and typographic luxuries such as shoulder notes will not be possible. The method of calculating the unit cost is therefore of interest to the typographer, but since it is not his responsibility it is not discussed in this chapter. The factors of the equation, however—the different kinds of cost—must be recognized if they are to be rightly handled.

Production costs which are incurred once only, however many impressions are printed, can be known as non-recurring costs; the chief of these is usually composition. Whatever their nature, they form a substantial part of the total cost, and the manner of their disposition radically affects the unit cost. When only one impression can reasonably be expected, the entire non-recurring cost is usually added into the total from which the unit cost is produced. At the other extreme, when many impressions are confidently expected, the non-recurring costs are sometimes disregarded when the unit cost is calculated. When the non-recurring costs are spread over a single impression, to double the impression is naturally to halve the non-recurring cost per copy.

A few items may be described as occasionally recurring costs. If the book is frequently reprinted, they are likely to recur, but not at every impression. Duplicate plates (but not moulds) are an example; if after five impressions they will be too worn for further use, one-fifth of the cost of each set of plates could be spread over each of these five impressions. The unit value of occasionally recurring costs is rarely high, and varies little according to the length of run.

Running costs are those which occur whenever the book is produced, whether at first or in a reprint; the major running costs are paper, printing, and binding, and however the unit cost is calculated, these items will contribute to it. Running costs are of two kinds. Variable running costs are those which vary per copy according to the number of copies produced; they combine the initial cost of setting up a machine, and the running cost of keeping it going. Letterpress printing is a typical variable running cost; an impression of one copy would bear the entire cost of make-ready, 1,000 copies would each bear one-thousandth part of that cost as well as the cost of running the machine for 1,000 impressions. An increase in run, then, reduces the variable running cost per copy, but far less drastically than it reduces the non-recurring cost per copy. Paper, on the other hand, usually costs the same per copy however few or many copies are produced, and costs of this kind may be known as constant running costs. No increase or decrease in the number of books produced affects the constant cost per copy.

The length of the run obviously affects the unit cost, and the extent of its influence depends on the method by which the total cost is converted into unit cost, and the proportions to each other of non-recurring, occasionally recurring, variable, and constant running costs. If, for instance, the cost of composition is to be included in the unit cost, a composition charge of £250 will cost:

```
£1 per copy for 250 copies

10s. ,, ,, ,, 500 ,,

5s. ,, ,, 1,000 ,,

1s. ,, ,, 5,000 ,,

6d. ,, ,, ,, 10,000,,
```

If the non-recurring costs are wholly or partly set aside from the unit cost, the length of run will still affect the unit cost through the variable running cost. The effect on the unit cost of this progressive reduction in the variable running cost is naturally emphasized if the non-recurring costs are not included, since each of those costs which are then included becomes a larger proportion of the whole.

By classifying the various costs of production and knowing how each class is to affect the unit cost, the typographer can see at what points and how far the economy of a book's production is elastic, and can also calculate, for instance, what extra outlay on constant running costs will be made possible by the effect on non-recurring and variable running costs of an increase in the number of books to be produced. Thus, if the printing number is doubled but the same unit cost is permissible, improvements to the quality of the paper and the style of the binding may be made possible by the reduced proportion of the unit cost absorbed by printing.

It is the unit cost which is the prime factor in limiting the style in which a book is produced, but when a large impression is in hand the typographer may also have to be careful of the total cost. An increase of 1d. to the unit cost of a book to be published at 12s. 6d. may not have much effect on the published price, but if the impression is to be 100,000, the total cost of the increase will be nearly £400, a sum for which the publisher may wish to consider some other use.

The first pages of this chapter may appear to suggest that estimating is complicated and difficult. In earlier chapters the techniques of book production are described, so briefly that they may appear to be simpler than they are. Conversely, in this chapter, terms not in general use, such as 'occasionally recurring cost', are introduced to describe calculations which are less difficult than they sound. The kind of estimate which the typographer carries out is elementary; it is the estimate he receives from the printer that may be considered an exacting task, which there is no

need to describe here. The designer's need is to know what figures are required, where to find them, how to combine them into a total for the impression, and which of them appear partly or wholly in the unit cost.

§215 · EDITORIAL

Editorial charges are not strictly the designer's affair, but it is unlikely that anyone else will accept responsibility for their affect on his estimate. Economy in design may in fact be necessary to compensate for the cost of extra editorial work. This work may begin with the advice of an expert outside the publishing house, who is invited to comment on the manuscript; go on to the services of a foreign or specialist proof-reader; continue with copyright payments for extracts or for illustrations; mount up with the charges of an indexer not on the publisher's staff; and culminate in an outright payment to the author in lieu of royalty. Editorial costs are non-recurring.

§216 · COMPOSITION

Not only as a total but as a cost per page, composition costs may vary drastically from book to book, and should as a rule be estimated by the printer. Accurate casting off is a laborious business which the designer will rarely want to undertake; the extra cost of tabular work, small type, display composition, and headlines is extremely difficult to foresee. Foreign composition sometimes costs substantially more than English; not only, for instance, are Arabic characters unfamiliar to most compositors and therefore slow to set, but the Monotype caster has to be set to run backwards in order to cast characters which are read from right to left. The composition of advanced mathematical formulae requires an amount of hand-composition out of all proportion to the time needed for keyboard work. Bad copy is always more expensive to set than good copy.

The cost of extra proofing may have to be allowed for. The printer needs to know what stages of proof are to be expected, and how many proofs will be required at each stage. A straightforward book such as a novel is likely to need fewer stages of proof than a complicated textbook, and this will affect the cost of composition. Most publishers need a number of publicity proofs, and the printer must know what form these will take, whether slip-page roughly trimmed to size on all four sides and perfect-bound, or imposed pages sewn and cut flush and glued.

If the printer has to buy special equipment such as accents or even a fount of matrices, the whole of the cost may be included in the composition estimate. If the printer can expect to make further use of the equipment, he may reasonably be expected to bear part or the whole of the cost.

It is always as well to increase the estimated cost of composition by at least a part of that proportion of the correction cost that the publisher has undertaken to pay. Usually, for instance, the contract stipulates that the author will pay only for corrections above say 15 per cent. of the cost of composition, and that the publisher will pay up to 15 per cent. In the setting of a classic work by a dead author, there should be no need to add anything for author's corrections, particularly if the book is to be reset from a printed copy; with the ordinary new book by a living author, up to the full amount of the cost of correction which can be charged to the publisher should be added, according to the nature of the book and to the tendency of the author to have second thoughts.

Whether or not to keep type standing may not at first appear to be a matter of book design, but the decision tends to affect the quality of reprints. Before deciding, the typographer will do well to balance the typerent over a period of years against the cost of moulding and casting plates, or of pulling reproduction proofs and preparing offset plates.

§217 · ILLUSTRATORS

Guessing the cost of illustrations to be drawn by an artist is even less useful than guessing the cost of composition. The amount of actual work in a picture is almost impossible to foresee by anyone who could not draw the picture himself, and even the cost of artists' materials may provide an unexpected complication. Unless the designer can be certain that the work is perfectly straightforward and that the charge for it by the artist he has in mind will not vary much either side of a certain sum, he should ask the artist what his charges will be. It may be necessary either to find a cheaper artist or, better, to plan the illustrations in a style which will cost less. In any case, the illustrator's fees are a non-recurring cost.

If the book is to be illustrated with photographs, the cost of the copyright fees and agency charges will have to be included, and also that of having prints made. There is a very sharp division here between commercial and non-commercial practice; the British Museum, for instance, will supply a large and perfect print, which is the buyer's own property, at a cost which is sometimes only a fraction of the agency fee for a heavily marked print in small size which has to be returned.

Process engraving is regulated by a comprehensive scale of fixed prices which is observed by all members of the Process Engraver's Federation. Any engraver who is a member of the Federation should be able to supply a copy of the booklet of standard charges. This is so thoroughly compiled

¹ Terms of agreement and schedule of average fees for book illustration (Society of Industrial Artists, 1953) may, however, be found useful for reference.

and clearly set out that estimates from engravers should rarely be necessary; the exceptions are when some particularly complicated handwork is necessary, as, for instance, in retouching the original or in laying mechanical stipples, or when a photographer has to be sent out to the subject, instead of the subject being sent in to the photographer.

Reproduction by alternative printing processes, and colour reproduction, do not always lend themselves to estimating from standard rates, and estimates have to be requested if accurate figures are wanted. Much depends on the nature of the original to be reproduced, and even when the subtleties are appreciated by the typographer, their effect on the costs of reproduction are almost impossible for him to foresee.

§218 · MATERIALS

All materials are constant running costs, unless an increase in the length of run enables the designer to order a making of the materials at a lower price than when he orders them from stock.

The price of paper is reckoned sometimes by the ton, and sometimes by the pound. For estimating purposes, the typographer will wish to convert it to the price per ream, since the amount of paper required is calculated in reams.

Text paper is usually bought in reams of 516 sheets; this allows the printer to print 500 sheets and to waste about 3 per cent. of what he uses. The wastage in colour printing may be rather higher; for ordinary runs in black only it is enough; for very long runs it should be more than enough. Unfortunately no agreed scale of wastage exists, but a reliable printer can usually print and bind a few extra copies from reams of 516 sheets. If the ream is less than 516, some extra sheets may have to be added for waste.

Calculation of reams which include wastage allowance is easy, but requires checking to avoid gross error. Thirty-two octavo pages are normally printed on each side of a quad sheet, so that there are 64 pages in all on the sheet. Five hundred sheets therefore produce 500 sets of 64 pages, or 1,000 sets of 32. A normal basis of calculation, therefore, is that an octavo book requires one ream of quad paper per thousand copies per 32 pages. A quarto book needs twice as much, a 16mo book half as much; care must be taken with subdivisions of extra large or extra small sheets —imperial 16mo, for instance, is bigger than crown 8vo. If double-quad paper is used, half as many sheets will be needed; if a double (half-quad), twice as many.

A ream of paper is normally described by its quality, its sheet size, its ream count, and its ream-weight in pounds. The price per pound

multiplied by the ream-weight gives the price per ream. That any special process in paper-making entails extra cost has already been mentioned. One of these special processes may be a final cut on two or more edges to ensure the squareness of the sheet, a quality not always guaranteed by the mill. Specially humidified paper will have to be wrapped in waterproof material. The price of paper fluctuates quite violently at times, and some foresight may be necessary when the cost of paper is being calculated, particularly if the paper will not be delivered for some time. This is true of other materials and also of printing processes, though changes in these charges may have a less drastic effect on the cost of the book.

Paper is usually provided by the publisher of the book—an arrangement which printers say does not always ensure supply of the most suitable material. If the printer supplies it, he tends to add a handling charge to his invoice to the publisher to cover his expenses in selecting, ordering, and paying for the paper, and perhaps in storing it for a long time before being paid for it. The publisher's typographer must therefore be cautious in estimating the cost of paper which he has asked the printer to supply.

The amount of paper needed for the plates of a book needs careful calculation, particularly if they are to be printed on small sheets, or if the illustrations are to bleed off at one or more edges, or if the plates are to be hooked. Art paper is often supplied without any wastage allowance.

The same considerations have to be remembered when the cost of the paper for the jacket or cover is being estimated. The size of the flaps may have to be adjusted in order to suit the sheet size. Like art paper, cover paper is often supplied in reams of 500 or even less; it is necessary to work out the number of plates, jackets, or covers which can be cut out of each sheet, divide the number of copies needed by the number of items per sheet, and add a suitable wastage allowance, expressing the result in sheets or dividing it by the ream-count to give the number of reams.

Endpapers are usually supplied by the binder, but the publisher who wishes to have printed endpapers sometimes provides them himself.

Cloth is sometimes provided by the publisher, but usually by the binder. If the binder is supplying materials, he includes them in his binding estimate; otherwise the typographer will have to calculate the amount of cloth needed per 100 or 1,000 copies of the book. The amount of cloth needed for the width of the book is twice the width of the board, plus the width of the spine (which will be more than the thickness of the book) plus about $\frac{3}{8}$ " to turn in at each fore-edge, plus $\frac{1}{8}$ " extra for each board if it is particularly thick, and the same for a deep joint between board and spine. The width of the cloth roll divided by this amount will show how many covers can be cut out of the width. The depth of the book's cover is calculated in a similar way, with $\frac{3}{8}$ " for turn-in at the head, and the same

for the tail, added to the depth of the board, and extra for particularly thick boards. The price of cloth is always quoted by the yard, and can be worked out per 100 covers as follows:

price per 100 covers =
$$\frac{100 \times \text{depth of cover in inches}}{36 \times \text{number of covers across roll}} \times \text{price per yard}$$

Boards and blocking material are always supplied by the binder, as are all other binding materials. With experience the typographer will become used to the differences in cost between strawboard and millboard, between the different qualities of each, between the various kinds of blocking material, and between gold and all other materials.

§219 · IMPOSITION AND DUPLICATING

When a book is first composed, imposition is charged as part of the process of composition. When printing is completed, most printers remove the type from its chase and store it page by page. If a reprint is necessary, the type has to be traced in the store, unwrapped, and reimposed. Similarly, if the book is to be reprinted from stereos or electros, the plates have to be brought out of the store and fixed to the mount in their correct position. In either case there is likely to be an imposition charge for the reprint which did not appear after the first printing, based on the number and size of pages. The charge is usually the same for plates as for type, and is usually based on formes of 16 or 32 pages.

The cost of preparing a duplicate printing-surface may have to be divided into two—the cost of preparing the mould or photographic image from which the duplicate is made, and the cost of making the duplicate itself. The reason for this is that once the mould or image is made, the cost of making it will not as a rule recur, and is therefore a non-recurring cost; but duplicates wear out after a number of impressions, have to be replaced, and should be treated as an occasionally recurring cost.

§220 · PRINTING

Machining is a variable running cost, which, if the extent of the book is known, can usually be worked out from rates supplied by the printer. These scales may be supplied in one of several forms. Common to all is the gradation of rates according to the length of run; the rate for 2,000 copies is never double that for 1,000, for instance—the cost of make-ready unbalances what would otherwise be a simple arithmetical progression. The longer the run, the less difference in cost per copy is made by an increase of a few thousand; the difference per copy between 1,000 and 2,000, for

example, is far more than that between 51,000 and 52,000. The difference in machining cost per copy caused by a difference in the length of run is greater in letterpress than in other processes.

Also common to all scales is gradation by maximum sheet size; this is usually indicated by the machine's maximum sheet capacity in width and depth. The rate is then given either per ream or per forme, say of 32 pages; the rate per forme of 32 pages is calculated by multiplying the rate per quad ream by the number of thousands of copies to be printed. The rates of various printers can be compared, and estimating simplified, if all rates for text machining are converted to the rate per forme of 32 pages; if a book of 160 pages is in hand, the rate per forme needs only to be multiplied by 5.

There is usually an extra charge for the make-ready of the blocks in the text, according to area and to whether they are line or half-tone. Some printers increase their printing scale if there are blocks in the text, because of the extra inking and care that will be necessary; there may also be an extra charge if the text is printed from stereos. These extra charges are usually expressed as percentages of the standard machining charge, and may be as much as 10 per cent.

The larger the printing press used, the cheaper the cost per page, as a rule; usually, however, there is no advantage to the publisher in using a perfector instead of a single-cylinder press. If the scale rate is for units of 32 pages, the cost per page of smaller formes is usually higher; a 16-page forme, for instance, may cost only 25 per cent. less than a 32-page forme. This difference in cost per page of an oddment will obviously have a greater effect on the cost per page of the whole extent of a short book than on that of a long book, where the oddment will be a much smaller proportion of the whole.

In special circumstances the printer may have to charge more than his scale rate. One frequent occurrence is that more ink is necessary than usual, either because the forme contains a high proportion of solid or nearly solid surfaces, or because a paper is supplied which needs a great deal of ink, such as a featherweight antique.

Colour printing usually costs more per colour than does black printing because of the laborious work of getting and maintaining register. The printing of plates, endpapers, covers, and jackets does not lend itself to accurate scale rates, and can be calculated either from a printer's estimate or by comparison with a previous job.

§221 · BINDING AND JACKETS

An accurate binding estimate will be essential before the published price can be settled or the binding order placed, but an approximate figure will do at the outset. The cost of binding is usually expressed in cost per copy or per hundred or thousand copies, and includes all materials that are to be supplied by the binder, jacketing, and delivery to the publisher.

When a printer is asked for an estimate it is comparatively easy to tell him all he needs to know, but it is equally easy to forget that the binder too must have a comprehensive description of the work he is to undertake, for instance, the imposition, the nature of the paper, the number of pages per section, the number of sections per book, the size in which flat sheets will be supplied to him, whether the book is to be sewn on tapes and if so how many, what plates there are to be and where they are to be placed and how fixed to the book, whether extra reinforcement is needed in the endpapers, the back or any of the sections, whether the corners are to be rounded, the top and fore-edge gilded or coloured, and headbands pasted on. Before he estimates for the case, he will need to know the size and thickness of board required, the quality of the cloth, the blocking material and surface, which edges are to be cut, and whether there is to be a jacket. In addition to all this, he must be warned of any departure from the routine style of binding.

Binding is a variable running cost. The difference in cost per copy between large and small numbers is not so high as that between large and small numbers printed, but when the binding number shrinks below 1,000 the cost per copy begins to rise sharply enough. The inclusion of materials, which are a constant running cost, in the binder's charges helps to disguise this variation.

The cost of a commissioned binding design, which is comparatively rare in Britain, is of course non-recurring. Brasses, electros, or other blocking surfaces are, strictly, occasionally recurring costs, but the endurance of brasses is such that they may often be considered as non-recurring.

Jacket costs can be defined in the same terms as those used for the rest of the book. The design is a non-recurring cost; the cost of blocks and duplicating may occasionally recur; paper is a constant running cost; and printing a variable running cost.

The typographer cannot regard his design for a book as completed until the cost of producing the book according to that design has been estimated with reasonable accuracy, and has been approved by the publisher. There is something to be said for the typographer's working out this estimate himself; in his preliminary rough calculations he may be able to adjust different parts of his plan in order to bring the unit cost down to a prescribed limit. Effective book designing for industrial production depends

on an intimate knowledge of current prices, which can easily be maintained by working out frequent estimates.

BOOKS

AVIS, F. C. - Printers' arithmetic - Luton, Leagrave Press, 1949.

COPY-FITTING-Scientific copyfitting for composition on Monotype machines - Monotype Corporation, no date - pamphlet: quarto.

ESTIMATING - Estimating for printers - British Federation of Master Printers, 1946 - bibliography.

See also, after chapter I, UNWIN.

Intention and result

To form a design or plan for an edition is to take only the first step towards production; the success of the design depends almost as much upon the manner in which it is put into effect as upon its own merits. The plan must first appear in visible form, for the instruction of those who are to carry it out. The work must be entrusted only to those likely to do it well; and the preparation of the book should if possible be supervised in detail through all its stages by the designer who planned it.

§222 · LAYOUT

Sketches or layouts of the typography of the book are nearly always necessary for the guidance of the printer, and the designer may find that in drawing them he can clarify his ideas and test their ability to be translated into type. Layouts are often drawn on sheets of paper trimmed to the size of two facing pages of the book. The layout sheet will be more like reality if a fold separates the two pages, and if $\frac{1}{8}$ " or so in the back of each page is nipped together as in the book after it has been rounded and backed. The text margins can then be sketched on both pages, in order to show how an opening will appear, and the measure and number of lines per page can be worked out. There is not much to be gained from trying to represent text composition on a layout, but anything that is not extremely simple in explanation may be clarified by sketching; the sketch may include the arrangement and position of headlines and page numbers, the style of the subordinate headings, the placing of the illustrations, and any other details which are not entirely routine. The typographer who requires extreme accuracy in settling margins sometimes outlines the top and bottom of the text area along the top and bottom of the x-height of the topmost and lowest lines, since the area will appear to end with the main body of the lower-case letters rather than with the extenders.

The actual choice of text fount and of measure and leading may depend to some extent on imagination, but specimen settings are even more valuable. A collection of specimens can be extremely useful, not only in assisting the choice but in demonstrating it to those who are not themselves very familiar with types. Differences between the paper and the printing of the specimen and those of the intended book will have to be borne in mind.

There are various methods of drawing layouts for display lines and preliminary pages, and they fall into three groups (figures 85–7, pages 390–2). The quickest kind of sketch may be described as a rough layout; since it is by no means easy to do effectively, and since it leaves much to the compositor, it is perhaps at its best in the hands of an experienced designer, who either works in a printing office or knows his compositors extremely well. The type-sizes are chosen mentally, and the copy roughly written out in position and size corresponding to the printed display. If the centred style is used, the display lines must of course be approximately centred. Only in very skilled hands will this method indicate the actual width of display lines. The typographer who relies on this kind of layout must be ready to make a number of corrections to the spacing in the proof stage, and to decide whether his own time or that of the compositor is more valuable.

The fair layout is a reasonably accurate pencil drawing of the display. Some typographers like to work out their design on paper, independently of any subsequent usefulness of the layout in instructing the compositor. Having chosen the founts in which the various lines are to be set, the typographer decides the exact position of each line, and in that position draws faint lines to indicate the x-height of the letters. The length of each display line can then be roughly worked out, and drawn lines outside the probable length erased. The size and position of each display line is now represented diagrammatically on the layout sheet, and can be adjusted if necessary. The actual letters can next be drawn in. Tracing the letters from printed specimens is sometimes recommended, and will be useful if large type is to be used and there is doubt about its fitting. Usually, however, the designer should be capable of copying them by eye accurately enough to show what width they will occupy. One easy, though rather slow, method of making sure that sketched display lines will be centred accurately is to draw them roughly on waste paper, for length, and to draw the letters on the layout in alignment with those on the waste. Small type may be carefully written, if the writing can be made to approximate in width to the type, or may be indicated only by parallel ruled lines, separated by the x-height of the chosen fount. Illustration or decoration may be sketched in; the general effect, of area and weight, is more important than detail.

The founts to be used may be indicated on the rough or the fair layout, or may be indicated only on the copy. Letter-spacing in display composition should be marked in points, in text composition in units. All spacing should be marked, if it has to be marked, in the actual units that the compositor will use; the fair layout should represent the spacing with reasonable accuracy. If founts are marked on the copy but not on the

layout, the source of any ornaments must not be forgotten, although they do not appear in the copy.

The fair layout may take some time to prepare, but it is a satisfying method of design, and if well drawn should make corrections in type almost unnecessary. There should be no need for second thoughts, only for comparison between the proof and the layout, to make sure that they correspond. The typographer who spends a long time on a fair layout, and then requires the compositor to spend a long time on alterations, is adding unnecessarily to the cost of the book and to his employer's overheads.

What may be described as a finished layout should rarely be necessary in book design, except for jackets. It consists of a drawn imitation of the finished result, similar in colour and finish as well as in outline. Every letter has to be drawn accurately in black or coloured ink, if display composition is shown on this kind of layout; if colours are used, the colours of the layout should be similar to those to be used for printing. In either case, the paper on which the layout is drawn should correspond as nearly as possible to that on which the job will be printed. This kind of layout is commonly used only for jackets, since it may take several hours to prepare. Its purpose is to show almost exactly what the finished article will look like.

§223 · THE CHOICE OF A PRINTER

Any design for a book can be ruined by almost any printer or binder. The typographer who hopes to see books produced in the form he planned for them will do well to be extremely careful in choosing the people and the machines to carry out his plan, and thus to diminish the chances of failure.

The best of book-printers in Britain are very good indeed. A few great printing-offices are the severest of critics of their own standards of production; several of them are capable of designing books on their own account, and the number of printer's typographers is growing. Nobody is better placed than the printer's designer to make good use of whatever material and skill may be available, and publishers who are interested in good typography will often do well to leave designing to printers capable of carrying it out. Some printers of this kind take pride in their ability to cope with composition out of the general run of work; they have a wide range of type-faces for text composition, and can accurately set up specialist works such as mathematical or foreign books. All good printers can either guarantee the accuracy of the reproduction of copy in type, whatever the language, or in extraordinary cases will warn the publisher that proofs have not been read by an expert. Leading presses should as a rule be left

to use their own house style in composition; the use of the printer's house style is a guarantee of consistency, and the style itself springs from long experience and study.

These leading book-printers usually have standard rates according to which all work is charged which lends itself to standardization. Their prices are on occasion rather higher than those of some lesser printers, but the experienced typographer will remember that buying printing is much the same as making any other really important purchase. An article of the best quality, whether a house, a car, a suit of clothes, or a book, not only speaks well for those concerned in its production, but looks better and lasts better than a second-rate article. The wise publisher buys the best he can afford.

Book-printing is a special technique which is not by any means within the compass of every kind of printer. The only certain guide to who is and who is not a book-printer is experience, and this may be costly and bitter. The typographer can also refer to the list of members of the book-printers' section of the British Federation of Master Printers.¹

Perhaps the surest tests of a reliable book-printer are consistency of style in composition, accuracy and intelligence in proof-reading and correction, initiative and common sense in the make-up of pages, and evenness of colour throughout the presswork of the book.

Those book-printers who are not among the leaders of their trade should not as a rule be relied on either for design or for the maintenance of quality. This means that they need more detailed instructions than those presses which can produce a satisfactory solution to any problem that arises, that more strict supervision is necessary, and that as few as possible important books should be entrusted to them. They are, however, specialist book-printers, and may be left to carry out routine work decently after comprehensive instructions have been given.

A growing number of book-printers have their own binderies, and there are advantages to the publisher as well as to the printer in having an edition completed under one roof. The printer can relieve the publisher of the problem of imposition, and if work is urgent each sheet can go straight from the press-room to the folders as it is printed. It is, however, well to know what binding equipment and skill are available in the printer's bindery, and also to compare his binding price with that of a trade binder. Otherwise the typographer may find that for the sake of a minor convenience he is paying a high price for inept work.

Printers who are not book-printers should on no account be required to produce books, except those of the very simplest kind, which approach

¹ This was published in *The Times literary supplement's book production section* of 10 February 1950; the list showed 61 printers, and the section also included a list of 42 bookbinders.

the nature of a brochure or pamphlet. The standards of composition and imposition, and of the evenness of presswork throughout the whole book, which are the book-printer's constant aim, may be completely unknown to the general printer. General printers who have developed the specialized skill as a side-line have shown themselves capable of excellent work, and for the typographer's purpose may be considered to be book-printers; their prices, however, are sometimes considerably higher than those of the specialists, and this seems often to be true of colour printers who maintain a studio of highly-paid retouchers and a variety of costly equipment rarely useful in book production. On the other hand, general printers may be more ready to cut their prices than will reliable book-printers, or may through the use of slapdash methods or of an inaccurate costing system be able to offer lower rates. The typographer who seizes the lowest price wherever he finds it is risking not merely failure but disaster.

Another point to bear in mind is that work should be offered only to printers who have the capacity to handle it. If an immense task is laid on a small firm which has done some distinguished work, the firm is likely to call in a friend in the trade to help, and may not always tell the publisher what arrangements have been made. The friend's standards may not be such that he should have been entrusted with the work, and his identity will not be known until too late.

Members of the Federation of Master Process Engravers are bound by agreement to a standard schedule of prices. Quality of work must therefore be the criterion as far as possible, and this can be seen by careful and invariable comparison of proofs with originals; the differences between one engraver's work and that of another may not be obvious to the beginner but will soon begin to appear. If a colour-printer has his own engraving plant, he should as a rule be allowed to make his own blocks; the closer the co-operation between engraver and printer the better.

§224 · SPECIMENS

Particularly when printers not of the first class are concerned, the meticulous examination of various kinds of specimen is vital to the maintenance of quality. Specimens should be considered methodically, detail by detail, and the slightest fault pointed out; if a single fault is overlooked or unmentioned, the specimen might almost as well have never been submitted.

The most usual kind of specimen is the specimen setting. Having outlined his requirements to the printer, the typographer asks for a specimen setting, and for an estimate based on the style of that setting. This setting usually helps the printer to prepare a particularly accurate cast-off, and so serves its first use before the typographer sees it. To fulfil all its purposes,

the specimen setting should be set up from the correct copy, should consist of two facing pages of text, carefully imposed, be printed on paper similar to that to be used for the book, and should be cut to the intended size of the cut page. When working for the first time with a printer, the typographer should describe the form he wishes specimens to take, and further instructions will then be needed only when something out of the ordinary is in hand.

When the specimen comes it should first be compared with the instructions given to the printer, to ensure conformity in fount, measure, leading, margin, trimmed size, and all other typographic requirements. If it does conform, the designer must be sure that the effect is what he intended; only a designer of long experience can imagine exactly the appearance of a text page without having seen a specimen, and adjustments may be necessary. The specimen should be searched very closely indeed for signs of worn or wearing matrices, or wrongly aligned or fitted letters. Casting faults are one of the curses of British typography; no printer is immune, all are capable of putting the matter right if warned in time. Next, the standard of composition should be examined; this of course applies particularly to spacing, especially of punctuation and words. Anything that will recur on every page, such as headlines or sub-headings, must be closely examined and precisely adjusted to avoid expensive corrections in proof. If there is doubt about less frequent items such as chapter-headings, they may be left for adjustment in proof without heavy cost, so long as the first proofs are not divided into pages. If radical changes are made a revised specimen should be requested, unless the designer is confident of imagining the effect of the alterations. Finally, the specimen setting must be submitted for the approval of, and perhaps defended against, the publisher and sometimes the author. The book designer is the servant of all bookreaders, and should take the opinions of laymen seriously, however untechnical the language in which they may be expressed. Approval of the specimen will be the final step before the publisher is committed to paying the high price of composition and proofing; before the work is begun the designer must be entirely certain that he himself and everyone else responsible is satisfied with his plan.

Another kind of specimen which will have to be approved eventually is that submitted by the binder. This may be anything from a small cutting of the proposed cloth to a bound and blocked dummy of the finished book. Here again the specimen must be compared with the instructions and with the designer's intention, and in addition to its visible and tactile quality its durability and mechanical effectiveness must be examined. If the bound dummy will not open flat, there may still be time to change the paper. A bound dummy of the exact thickness of the finished book is essential to

the design of both spine lettering and jacket, and should be used for this purpose before being returned to the binder (unless a second dummy is specially ordered).

§225 · PROOFS

Every single proof should pass through the designer's hands and be seen by him, if he wishes to be sure that the book will take the form he intends.

The first proof as a rule will be the slip or galley proof, pulled before the text has been divided into pages. There is not much to be done at this stage, except to look through the slips for unsatisfactory spacing and for casting faults; when these proofs are returned the author's corrections should be examined, partly because they may be excessively costly, and partly because they may alter style or otherwise affect the original design.

The page proofs need more attention. If each chapter begins a new page, consistency of style in chapter headings and drops must be checked, and there may be the placing of initials to note. The composition and placing of headlines (particularly their centring, which is sometimes erratic), and the arrangement of illustrations in the text, may need adjustment. If possible the designer should alter composition or paragraphing or both in an inconspicuous manner in order to prevent words from being broken between pages and short lines from appearing at the head of pages. There is perhaps not much harm in a short line which extends farther to the right than the right-hand end of a centred headline above it. When short lines are numerous, as in a novel full of conversation, they may have to be left at the head of the page, since correction throughout would be uneconomic. In the best work the page will look neater if it does not end with a short line, but this kind of tidiness is rarely attempted in ordinary book production, and may be extremely difficult to achieve.

At this stage, if not before, the preliminary pages are probably submitted in proof, and should be compared with whatever layouts were sent to the printer. Display lines should be examined rigorously for battered letters and for wrong founts. Final proofs, whether imposed or not, should be examined in the same way as galley and page proofs, and if they are imposed the margins should be checked. Meticulous designers may wish at this stage to adjust the style of signature marks and catch-words, which may not have appeared in earlier proofs. Batters may also have been inflicted on the text in the course of correction and imposition.

Engraver's proofs should be compared with the originals for reduction, sharpness, and, in half-tones, weight of colour and relative emphasis. One set of engraver's proofs should always be sent to the printer to indicate the result to be aimed at.

Proofs from offset plates indicate the sharpness and depth of the image;

the first quality is particularly obvious in the reproduction of type, and the second in half-tones. If possible, type reproduced by lithography should be compared with reproduction proofs of the text, and proofs of the illustrations should certainly be compared with the originals. Adjustment at this stage, however slight, may, of course, entail printing down a new plate and considerable expense, and corrections should as far as possible be restricted to earlier stages of proof.

Before beginning the initial binding run, binders should be asked to do up a few advance copies for the publisher's approval. These are, in effect, the final proof of the binding, and they should be closely examined with this in mind; there may still be time to make a minor or even a major change.

If the work has been well planned and well carried out, the arrival of advance copies can be a delightful moment. Surely the least inspired of typographers must feel a quickening of enthusiasm and hope as he opens the book he has designed. It is for this that he has trained and exerted himself so long; this is the fruit of his arithmetic and technical knowledge, of his experience and taste, of his ability to create, and of the labour of his hands.

§226 ⋅ ON THE SHELF

When at last the book is made, there is other work for the typographer to do, and to return to the finished task is not always easy. Quality, however, can be maintained only by continuous effort, not by spasms. Subsequent binding orders of the first impression, reprints, and new editions must all equal in quality the original product. Alterations to the text or to the general style of the book must be supervised, and advance copies of every new impression compared with a copy of the first impression. If subsequent impressions are printed on a thinner paper than that originally used, the spine of the book will be narrower, and adjustments to the brass and the jacket may be necessary.

To be watchful of the book's endurance in use is less easy. Only the most conscientious designers seek out their books on the shelves of the public library, to examine their condition before they have to be rebound. Most libraries naturally get the best wear possible out of the publisher's case before rebinding, and examination of the number of withdrawals of books before rebinding can be rewarding. It is usually the binding that is most worth examination—the appearance of the cloth and blocking, the strength of the back, and the tenacity of the plates.

To be too much a technician and too little a layman is a fault in a typographer. Most of the qualities of good book production are capable of appreciation by any perceptive reader; a flat opening, a clean impression, and a clear reference system are of more value than extreme subtleties in the choice of type. The designer's task on a book can best be completed long after publication, when he can draw it from a shelf, open it as though it were strange to him, and ask himself whether it is so produced that it tempts him to read it.

The purposes of book design

The practice of typography, if it be followed faithfully, is hard work—full of detail, full of petty restrictions, full of drudgery, and not greatly rewarded as men now count rewards. There are times when we need to bring to it all the history and art and feeling that we can, to make it bearable. But in the light of history, and of art, and of knowledge and of man's achievement, it is as interesting a work as exists—a broad and humanizing employment which can indeed be followed merely as a trade, but which if perfected into an art, or even broadened into a profession, will perpetually open new horizons to our eyes and new opportunities to our hands.

DANIEL BERKELEY UPDIKE: Printing types

In the preceding chapters, methods of book design today have been discussed in some detail. In conclusion, the principles which govern the practice of the craft may be summarized in general terms.

The qualities of a book's appearance and structure, which are determined by design, depend to some extent upon each other; a well-designed and well-printed page, for example, will not please the reader if it will not lie flat, or if after a little use it begins to deteriorate. Visual as well as structural qualities depend almost entirely on the adjustment of all variables to each other, rather than on successful attention paid only to a few items. A well-produced book is distinguished not by a single conspicuous characteristic but by harmony between the various parts, and by a pattern imposed upon the whole; to design a single graceful chapter opening is not enough—the chapter headings throughout the book should as a rule match each other in their position on the page. The processes involved in book design may be classified as editorial planning (in which the text may be rearranged if necessary in preparation for printing, for the benefit of author and reader), visual planning (which determines the appearance of the printed image), and technical planning (which is concerned with the structure of the book and the methods of its manufacture). The editorial and visual aspects of the design derive most of their effectiveness from technical planning. Success at one stage or in one aspect alone is never enough, but failure at one is more than enough.

Clearly, then, the different processes of book design are too closely linked to be undertaken as entirely separate stages. Some specialization, of course, is common, for the graphic or technical specialist—the illustrator, perhaps, or the binder—may achieve more in his own field than the all-rounder can hope to do. The utmost efforts of the most studious of typographers will hardly bring him level in knowledge of one particular aspect of his craft with the artist or technician whose skill derives from concentration on that aspect alone. The book designer cannot be an expert in everything he needs to know, and should always value the opinions of others engaged in book production, of those who distribute books, and of those who read them; indeed, he should know much of these different points of view without having to inquire. But whatever influence or advice he accepts, and however far he delegates different parts of his task to different specialists, the typographer who wishes to produce entirely successful books must seek to gain and to keep responsibility for all the planning and supervision of which book design is comprised.

The possession of technical knowledge is vital—it is the principal tool of the designer's craft, which shapes not only his books but his methods. It is not so much that the typographer may find this knowledge useful, as that every problem he approaches must be seen in its light. The appearance and structure of the printed book result from the techniques used in its manufacture; the book is not an art-form but an industrial product, shaped by an ancient kind of industrial design. The book designer relies equally on a technician's knowledge of a variety of processes and materials, though not necessarily of details of procedure; on a sub-editor's understanding of the needs of author and reader; on an industrial artist's creative ability in the arrangement of mechanically produced patterns; and on an unrelenting care and mastery of detail. In the words of a great book designer: 'The success of printing lies in never for one instant relaxing in the inspection of details until the book is actually bound.'

If these are the qualities which the typographer needs, how are they to be put to use? The purposes of industrial book design naturally spring from those of the book and from the nature of mass-production. The purposes of the book can be gathered into four groups.

A book is to be sold. The designer's task is not so much to settle the price as to make the best use of the permissible manufacturing expense, planning the book for economical production, and exploiting to the full the techniques and materials available at the stipulated price. The book must attract the buyer, and be worth possessing as a physical object, not merely worth borrowing; its price must be within the buyer's reach, and its appearance and construction should make the price a bargain. The

¹ BRUCE ROGERS: Report on the typography of the Cambridge University Press, 1917.

requirements not only of ordinary readers but of booksellers and librarians must be allowed to influence its form.

A book is to be laid open, held, and carried. All but a few books are held while being read, and most books are carried about to some extent before and after reading. No book can be considered legible unless it lies flat when open; it should not have to be held open. The printed part of the pages at which the book is opened should be nearly level, not curving inwards towards the spine. Bulk should be proportionate to format, as far as possible; the very stout, squat book is as inconvenient to hold as the very large thin book. Every book should be designed to withstand whatever handling it will receive without unduly rapid deterioration.

A book is to be seen—of course it is to be read, but it is also to be looked at. It must be capable of being read with ease, speed, and accuracy by the reader and in the conditions for which it is intended. This can be achieved only by the precise adjustment to each other of all the variables of the text page, and is a matter of paper and presswork as well as of typographic arrangement. Illustrations no less than composition need to be planned by the typographer. The well-designed book presents an appearance of pattern and purpose; all its parts are planned to suit each other. The typographer must concern himself with the mental as with the optical process of reading, and must arrange the text and illustrations with their headings, notes, reference systems, and other accessories in a clear and convenient manner.

A book is to be kept. After being read it is set aside, usually on a shelf, to be read again one day. The book should if possible be of a size to stand between ordinary bookshelves; particularly large books are apt to be a nuisance. Once it is on the shelf the book should be able to stay there indefinitely without undue deterioration, retaining its qualities until its next use.

The advantages of mass-production techniques are speed and low cost rather than high quality; high quality, in book production at least, has to be imposed on the product by technical planning. The first purpose of this planning is to adapt the book's form to the methods and materials involved in its making, in the service of low cost and high quality. The structure of the book must be designed to withstand the stresses of use; even strength throughout is worth more than extra strength at one point, except that books intended for rough use may well be reinforced at points where the mechanically bound book is known to be weakest. Quality has not only to be achieved, it must also be maintained. The typographer's duty is to design not simply a book but an edition, the last copy of which should be very nearly as good as the first. Indeed, he may have to plan for a whole series of editions; the likelihood of frequent reprints may well influence

the design of the book. Quality in a book has little value without endurance in use and on the shelf.

Perhaps this conclusion, and the chapters which precede it, will be found to emphasize the arid, utilitarian aspects of typography, and the service rendered by planning to industry and commerce. But the intention of this book is to describe some methods of book design, not to prove the value of the craft or to suggest how it may be enjoyed. The value of book design is derived from the value of books. Pleasure is most easily to be found in a craft by those who have mastered its methods. Skill in book design can only begin with reading about it; mastery, and the pleasure that attends it, come from practice, in the service of author and reader, and from work on book production rather than from theories. No reader should suppose that this book, or any number of books, contains all he needs to know about typography. What has been said here should be no more than the beginning of the typographer's studies, particularly in technical matters, about which he should never cease to learn. Typography needs and deserves all the study and practice that can be afforded; the typographer who has ceased to learn, and to see his books as they are seen by the amateur of books and reading, has ceased to advance.

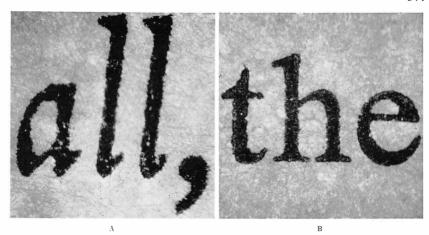
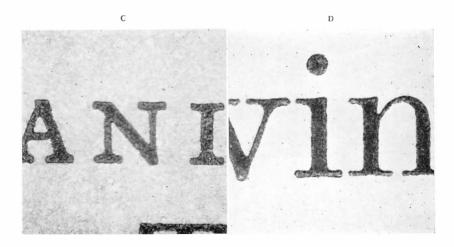


FIGURE 77. The printing of type

The photomicrographs in this figure are all enlarged by 15 diameters. The blocks are reduced to almost exactly two-thirds size.

- A. Letterpress on antique laid paper. The edges of the letters are rough, and there is a certain amount of squash and filling up, particularly in the bowl and round the finishing stroke of *a*. The paper also shows through the body of the stroke.
- B. Letterpress on antique wove. This is a smoother paper than A, and the letters are a little sharper in outline and rather more solid in colour.
- C. Letterpress on a machine-finished paper. On a smoother paper still, there is a certain amount of squash which expands the letters, but the edges are comparatively sharp, and the blacker outline characteristic of the process can be seen clearly. The ink film is thinner than in A and B and more of the paper shows through.
- D. Letterpress on supercalendered paper. The edges are similar to those in C, but the ink is denser and there is less distortion of the letters by squash.



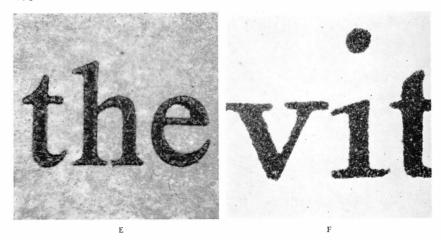
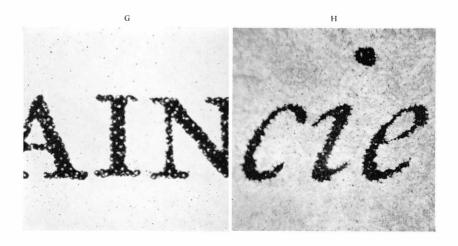


FIGURE 77 continued

- E. Letterpress on imitation art. The letters are more nearly accurate in outline than A-D, and the black outline is more pronounced. The paper shows through the ink as in C.
- F. Offset photolithography (albumen plate) on smooth cartridge. There is little distortion, since there is no squash. The edges have no extra sharpness, and the ink film is less black than in some of the letterpress prints. The grain of the plate gives the body of the strokes a mottled effect.
- G. Rotary photogravure on calendered paper. The edges and the bodies of the strokes are equally broken up by the gravure screen; this effect, however, is not always so obvious. In its solid parts, the ink is a deep black.
- H. Collotype, on a collotype cartridge. The grain of the process has broken up the edges of the letters, and the paper tends to show through the thin film of ink.



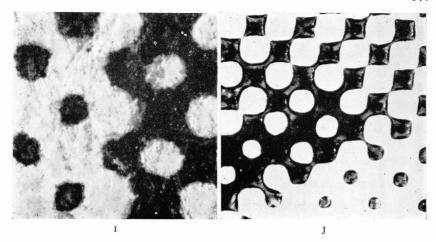
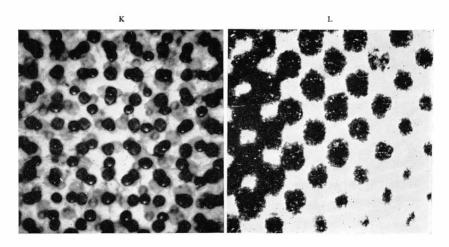


FIGURE 78. The reproduction of continuous tone

- I-L and N-Q are enlarged by 57 diameters, M by 60. M is almost exactly the same size as the original; I-L and N are just over two-thirds size; O, P, and Q are just under half size.
- Letterpress on newsprint. The shape of the dots is fairly even, but the paper fibres have broken up the edges and the body of the ink film to some extent.
- J. Letterpress on art paper. The ink film varies from a dense black to a light grey, owing to the difficulty of printing on an extremely hard paper; this is not entirely typical. The very sharp outline and regular form, on the other hand, are typical of this process and this paper.
- K. Four-colour letterpress on art paper. The black printing appears as small, glossy black dots; the yellow, as larger and duller black dots; the cyan, as large grey dots; and the magenta as smaller grey dots. The screen pattern unavoidable in colour half-tone can be seen clearly in the lower half of the picture.
- L. Offset photolithography on smooth cartridge. The dots are less solid in colour and much less sharply defined than in J, owing partly to the grain of the plate and partly to the fibres of the paper. The dot pattern therefore tends to be less obvious to the naked eye.



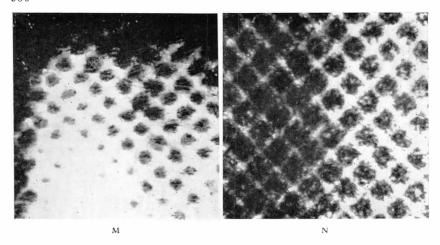
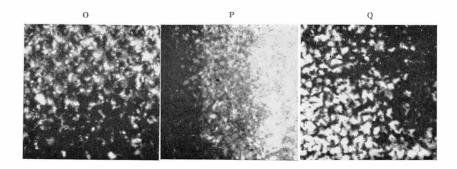


FIGURE 78 continued

- M. Offset photolithography from a bi-metal plate on smooth cartridge. The half-tone screen was of 300 lines to the inch, but the dots are no less regular in outline than in L. The depth of the dots in the printing plate produces a blacker colour in the solids.
- N. Rotary photogravure on gravure paper. The typical appearance of this process; the dots are more or less square and more or less equal in size, but they vary in blackness. At the left of the picture the ink has spread outwards from the deeper cells.
- O. Rotary photogravure on a supercalendered gravure paper. Here the screen pattern can hardly be made out at all. The motion of the cylinder has forced the ink in some of the cells to one side or one edge of the cell, and the ink has spread from most of the cells.
- P. Bitumen grain gravure on a heavy cartridge. The grain is much finer than the screen pattern in N and O, so that the process seems to approach continuous tone. There is also a marked difference in density between light and dark tones.
- Q. Collotype on cartridge. The fine, irregular grain of the process in the light areas consists of three lines meeting at 120 degrees. The lines vary in thickness but not in colour, except for the grey spread of ink at some points.



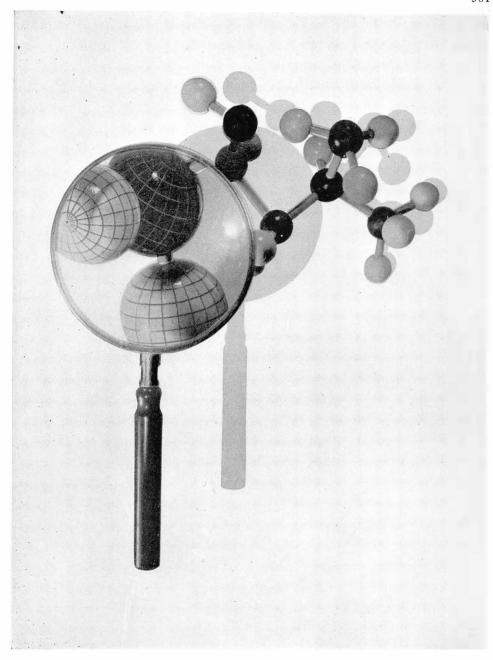


FIGURE 79. A striking use of half-tone technique, reproduced from a book designed by F. H. K. Henrion. The view through the magnifying glass has been enlarged and stripped in; and the shadow of glass and model appears in grey half-tone on a background from which the dots have been etched away. The effect in the coloured original is almost *trompe-levil*.

83 Packaging



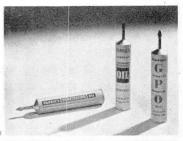


I Ronald Ingles MSIA of Design Research Unit for Pritchard & Constance Ltd Consultant Milner Gray RDI, FSIA Colours, black, white and turquaise

2 Peter Ray FSIA for Jaeger Advertising Agent Colman, Prentis & Varley Puckaging scheme for two classes of merchandrae, Star red, white, black, Crest other, white, black

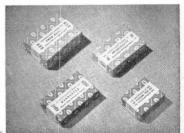
A. R. Hundleby MSIA
for Carr and Day and Martin Ltd
Oil tubes, size \$\frac{1}{2} \times 1, \quad \times 0, D \times colors;
light blue graund, red and black Penetroting
oil colours' yellow ground, red and black

- 4 Kenneth Lamble MSIA of Design Research Unit for Fling Ltd
- 5 R. H. Talmadge MSIA for Batger & Co Ltd Colours: crimison, buff and white
- 6 Ferelith Eccles Williams MSIA for Joseph Gillott & Sons Ltd Series of boxes for pen nibs in a variety of colours (one-colour pager, printed in different colour for each type of nib)









ii

FIGURE 80. Pictures of several different shapes and sizes, trimmed, reduced, and arranged to balance across an opening in a book designed by Herbert Spencer. Block numbers 1 and 2 on







- I Milner Gray RDI, FSIA of Design Research Unit for A. Rowland & Jons Ltd Bottles, closures, labels and wrapping
- 2 E. H. Cuff FRSA of The Metal Box Co for The Great Eastern Oil Co Ltd Metal box in red, black and yellow
- 3 Kenneth R. Hollick MSIA for Festival of British 1951
- 4 E. H. Cuff FRSA for The Metal Box Co Ltd Metal souvenir box





the recto range at the foot with numbers 2 and 4 on the verso; numbers 3 and 4 on the recto range at the foot with number 5 opposite. The captions range at the head with each other and with 3 and 4 on the recto.

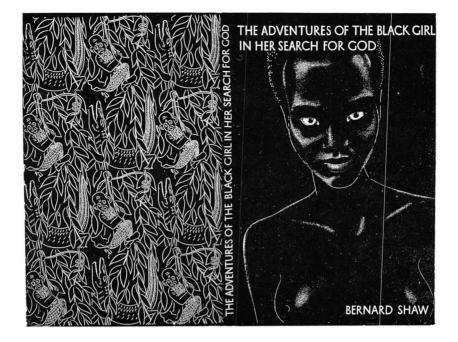
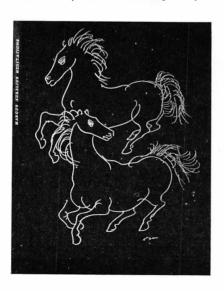


FIGURE 81. Examples of binding design

Above, a square-backed book whose endpapers (figure 82) and cover are white paper printed in black from designs by John Farleigh. Reduced from $8\frac{1}{4}$ " tall.

Below, kfi, a limited edition bound in black cloth blocked in gold from a design by Hans Erni. Reduced from 9k'' tall. The endpapers are reproduced in figure 82.

Below, right, a binding in blue cloth, blocked in dark blue ink and gold from a design by Berthold Wolpe and from a setting in Fry's Ornamented. Reduced from 8\hat{\(\frac{a}{2}\)}" tall.



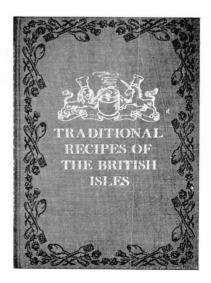




FIGURE 81 continued. Above, a remarkable design by John Lewis. The white vellum cloth was printed in five colours by offset lithography from a Speed map, with which the lettering (in Perpetua Bold) and a photograph of a composing-stick were combined. The jacket was printed with a similar design, but in four colours. Reduced from 84" tall.

Below, a contemporary design by John Begg. The spine and the adjacent part of each board are covered with yellow cloth, the outer part of the back board in black, that of the front in grey. The lettering is blocked in red-brown ink. The endpapers are yellow. Reduced from $9\frac{1}{2}$ " tall.

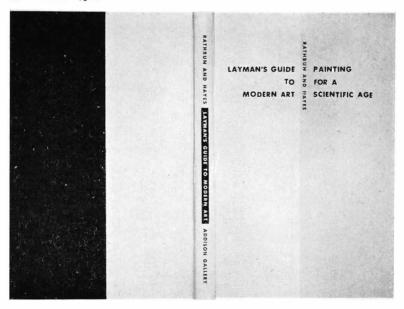
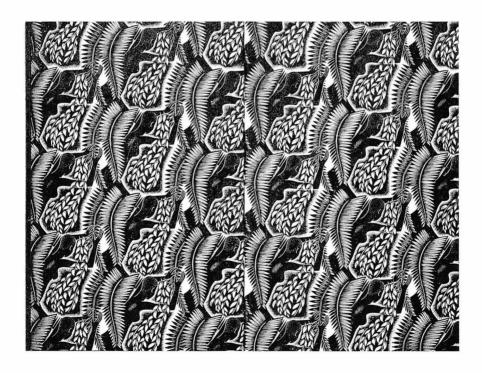




FIGURE 82. Printed endpapers. Above, a design similar to that used for binding (reproduced in figure 81), reversed in rust-red on a tinted paper. Below, John Farleigh's endpapers for The Black Girl, whose case is shown in figure 81.



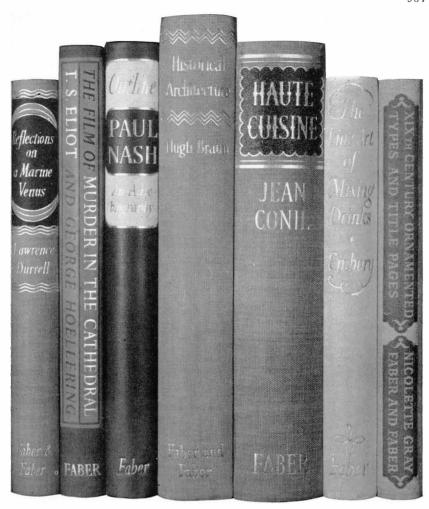


FIGURE 83. Seven spines designed by Berthold Wolpe. From left to right, *Reflections* – dark green ink and aluminium foil on light green cloth: *Murder in the Cathedral* – blue foil and aluminium on purple cloth: *Outline* – white foil and gold on dark green cloth: *Architecture* – gold on red canvas: *Cuisine* – dark green ink and gold on grey cloth: *Drinks* – aluminium on yellow cloth: *NIXth Century* – maroon ink on oatmeal cloth. The biggest book is 9½" tall.

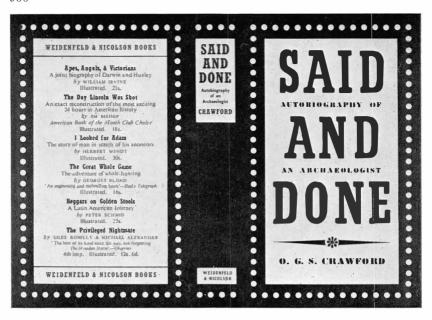
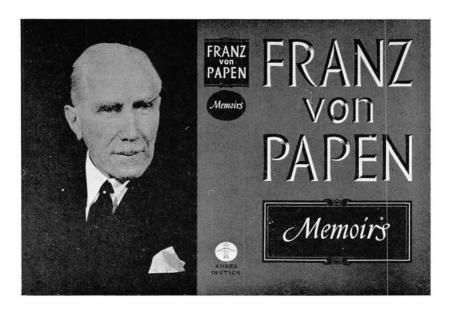


FIGURE 84. Four kinds of jacket. Above, a mainly typographical jacket for a demy octavo book, designed by Ralph Mabey, and printed in black and red on yellow paper. The title on front and spine is unusually emphatic. The border of dots is used by the publisher in his advertising. Below, a jacket by Francis Minns for a demy octavo book, combining lettering with a cleverly handled half-tone, and printed in black and red on white paper.



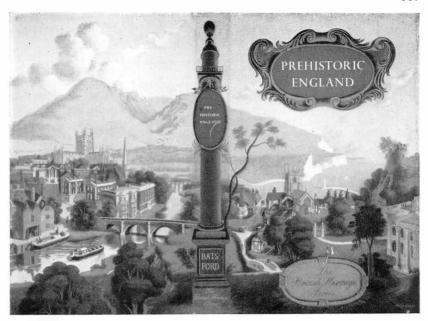


FIGURE 84 continued. Above, a picture jacket by Philip Gough for a demy octavo book published by B. T. Batsford Ltd. Batsford use many attractive jackets of this kind in full colour. The picture is carried round the back, and incorporates the title and other publishing details. These jackets make a very good showing in any bookshop, and encourage the bookseller to make displays of Batsford books.

Below, a series jacket designed by Hans Schmoller, with a device by Berthold Wolpe and lettering by Elizabeth Friedlander. The design allows the illustration, the book title, and the spine thickness to be changed without alteration to the rest. The advertisement on the back, all too often neglected by the typographer, has been designed with care and skill. Printed in black and green on white paper, and reduced from 10" high.

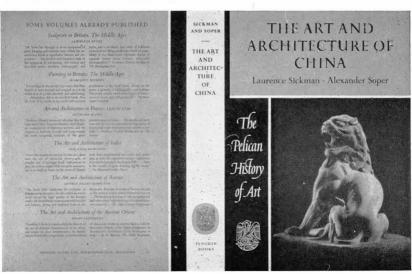




FIGURE 85. A rough layout for a crown octavo title-page, and the printed result. This kind of layout leaves the exact spacing to be corrected by the printer during setting, or by the designer in proof.

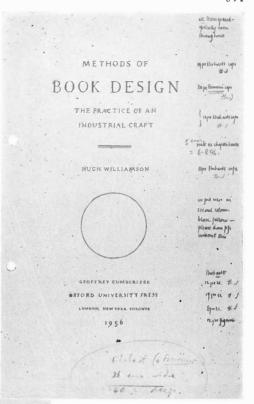
THE RETURN OF KING ODYSSEUS

Based on The Odyssey of HOMER



London
Oxford University Press
Geoffrey Cumberlege

FIGURE 86. An accurate pencil layout for a royal octavo book, with the proofed result. This kind of layout enables the designer to adjust spacing precisely while designing. Hardly any proof correction should be necessary.



METHODS OF

BOOK DESIGN

THE PRACTICE OF AN INDUSTRIAL CRAFT-

HUGH WILLIAMSON



GEOFFREY CUMBERLEGE
OXFORD UNIVERSITY PRESS
LUNGON NEW YORK TORONTO
1956

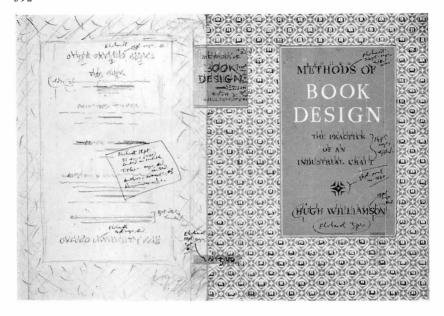
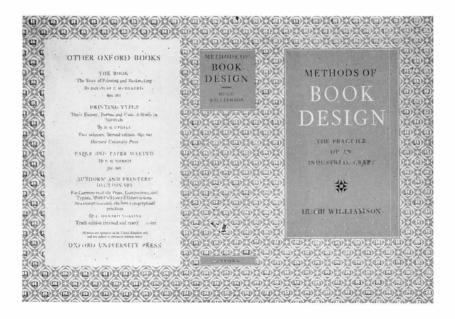


FIGURE 87. Above, accurate layout for a jacket by design staff of the University Press, Oxford. The layout is carried out on the same paper and in the same colours as the jacket proofs, below.



APPENDIX A

Format

Contemporary fashion in the choice of format for the various classes of book is of considerable interest to the typographer, but is difficult to ascertain. Convention is only one of a number of factors influencing the choice, and statistics cannot even indicate in full the trend of convention. Some figures are given here, however, to show the outlines of present customs.

According to the list of publications in *The bookseller* of 27 August 1949, just under a thousand titles were published or reissued in Great Britain during that month. No less than 38 different formats were used. Ten of these accounted for more than nine-tenths of the thousand titles:

crown octavo	448	small crown octavo	58
demy octavo	127	foolscap octavo	23
crown quarto	96	royal octavo	21
large crown octavo	64	demy quarto	ΙI
medium octavo	64	demy 16mo	ΙI

Total, 923. The remaining 28 formats accounted for an average of rather more than two titles each.

The supremacy of crown octavo was due to its popularity for fiction, which was by far the biggest class of book—one title in every four. Four-fifths of the fiction titles were in this size. Small crown octavo was widely used for paper-backed fiction.

Although nearly half the titles were produced in crown octavo, demy octavo appeared in far more classifications than did crown octavo. *The bookseller* classifies all titles by subject under about 50 headings, of which 44 appeared in August 1949. Crown octavo was used for well over half these classifications, but nearly all the classifications included at least one book in demy octavo.

Eight hundred and forty-two of the titles appeared in one of the octavo formats. Crown quarto, however, was especially popular for illustrated books, particularly books for young people; there were 132 quartos in all, twelve 16mos, and two each of folios, 12mo, and 32mo. Eight hundred and forty-three titles out of the thousand were produced in formats based on standard sheet sizes.

394 FORMAT

Of the 249 books of fiction, 202 were crown octavo, 31 small crown octavo, 10 large crown octavo, and 6 demy octavo. The 16 books of fiction and the 3 fiction anthologies published in foreign languages were all demy octavo.

Of the 134 children's books, 58 were crown octavo, 36 crown quarto, 16 large crown octavo, 8 foolscap octavo, 5 demy octavo, and the remaining 11 were divided among 9 formats.

Of the 60 educational books, 39 were crown octavo, 7 were large crown octavo, 4 demy octavo, and the remaining 10 were divided among 7 formats.

Of the 59 medical books, 17 were demy octavo, 12 medium octavo, 9 crown octavo, 7 large crown octavo, 4 royal octavo, 3 each demy and crown quarto, and 4 more divided among 3 formats.

Of the 48 religious books, 21 were crown octavo, 11 demy octavo, 9 small crown octavo, and the remaining 7 divided among 7 formats.

The other classifications included hardly enough titles to indicate any clear tendency in one month's publishing. A typographer interested in the custom for any particular subject could, however, work out similar figures over a longer period.

Type measurements

This appendix deals with some of the dimensions and proportions of some 12-point roman founts for text composition. The measurements are those which a typographer may wish to compare when choosing between two or more series.

The proportions of the 12-point fount of any series are not necessarily a guide to those of other founts in the series, but may be of use as a basis of comparison between series. The lower-case letters of smaller founts tend to be larger on the body and more wide-set in proportion to their x-height than the 12-point. On the other hand, if the 12-point fount of one series is noticeably smaller on the body and of narrower set than the 12-point of another series, that will probably be shown to be the tendency when the other founts of the two series are compared.

The measurements, but not the proportions, were supplied by the Monotype Corporation Ltd., and by Linotype & Machinery Ltd.

§227 · BODY-LINE

In table 1 the x-height of lower-case letters is compared with the thickness of the main-stroke (the body-line), as typified by the waist-measurement of l. The table shows which founts are bolder or lighter for their height, but not which are bold for their over-all size, which includes width. The hair-lines must be borne in mind; long, thin hair-lines, as in Monotype Bodoni number 3, may give a fount a lighter appearance than a fount with a slightly thinner body-line.

In certain founts the body-line varies from letter to letter; the name of each series which includes these founts is set in italic. Where the Linotype as well as the Monotype version of a series is shown in chapter 8, the two series are distinguished from each other by the letters L and M. Founts cast on Didot bodies are followed by (12 D) to indicate 12-point Didot.

Both x-height and body-line are measured in thousandths of an inch, and the ratios are approximate. In this table the first fount is that which has the thickest body-line for its x-height.

The results in table 1 may be interesting, but in themselves they are not of much value to the typographer. It is worth noting that a distinctly bold

fount like 12-point Times is in fact lighter, in proportion to its x-height, than a medium fount like 12-point Baskerville. These results are only a first step; they must be qualified by the width or narrowness of the various founts.

_		-	 -
л.	А	BI	

	body-			I	body-		
12-pt. l.c.	line	x-ht.	ratio	12-pt. l.c.	line	x- ht .	ratio
Bodoni No. 3	15.9	64·1	4.03	Spectrum (12 D)	11.2	67·0	5.82
Goudy Modern	14.0	60·1	4.29	Georgian	11.3	65.8	5.82
Bulmer	14.0	64·0	4.57	Janson	12.0	70.0	5.83
Caledonia	13.8	70.2	5.11	Estienne	10.0	58.7	5.87
Scotch No. 2	13.0	68·4	5.26	Plantin Light	13.0	77.0	5.92
Poli philus	12.4	66.2	5.34	Pilgrim	11.8	71.3	6.05
Scotch No. 1	13.0	69.5	5.32	Electra	11.5	70.0	6.09
Plantin	14.2	76.6	5.40	Lutetia (12 D)	10.7	65.9	6.16
Times Wide	14.0	76.2	5.44	Bembo	10.0	61.7	6.17
Perpetua	10.2	57.2	5.45	Romulus (12 D)	10.3	63.7	6.24
(L) Baskerville	12.5	68·o	5.45	Fournier	9.8	63.6	6.49
Emerson	11.1	6o·8	5.48	Old Style No. 2	10.8	70.2	6.53
Mod. Ext.	12.5	68.5	5.48	Walbaum (12 D)	9.4	62.0	6.59
Imprint	12.4	69.2	5.58	Bell	10.6	70.2	6.66
Ehrhardt	12.4	69.7	5.62	Van Dijck	9.4	62.8	6.68
(M) Baskerville	11.8	67·o	5.68	Garamond	9.6	65.5	6.83
Times	13.2	77.0	5.70	Caslon	9.2	65·1	6.85
Granjon	11.2	66·o	5.74	Centaur	8.4	58.8	7.00
Bodoni No. 2	11.0	63.6	5.78	Old Face 20	8.7	63·0	7.25
Bodoni No. 1	10.8	62.5	5.79	ļ			

§228 ⋅ SET

In table 2, then, the set of each 12-point lower-case alphabet is compared with its x-height. The set of a type character is the width of its body, not that of the letter; so that quite a narrow letter like 12-point Caslon is wide-set because of the extra space, or loose fitting, on each side of the letter. The set here is described in terms of the a to z length of the 12-point lower-case alphabet, and should not be confused with 'set' in the Monotype system (the set in points of the 18-unit character). As before, all measurements are in thousandths of an inch.

This second table is more likely to be useful than table 1. It shows which founts are wide-set for their x-height, and which are narrow, and is a guide to (though not a statement of) apparent size. If two founts of approximately the same x-height (say Romulus and Fournier) are compared, the wider (Romulus) will appear to be the larger. The widest founts appear first.

These results show the tendency of series which can be classified as old faces to be narrower for their x-height than other classes of roman letter.

Bodoni Number 3 appears at the head of both the first two tables, and has yet another form of extremity to come—the widest and blackest of all the founts examined.

TABLE 2

12-pt. l.c.	x- ht .	a-z	ratio	12-pt. l.c.	x-ht.	a-z	ratio
Bodoni No. 3	64·1	2098	32.7	Bembo	61.7	1834	29.8
Walbaum (12 D)	62.0	1959	31.6	Caledonia	70.5	2097	29.8
Bodoni No. 2	63.6	2000	31.4	Imprint	69·2	2041	29.5
Scotch No. 1	69.5	2180	31.4	Janson	70.0	2054	29.4
Scotch No. 2	68·4	2153	31.4	Bodoni No. 1	62.5	1833	29.3
Mod. Ext.	68∙5	2137	31.2	Granjon	66∙o	1903	28.8
Perpetua	57.2	1778	31.1	Emerson	6o·8	1751	28.8
Goudy Modern	60∙1	1862	31.0	Fournier	63· 6	1820	28.6
Romulus (12 D)	63.7	1972	30.0	Lutetia (12 D)	65.9	1890	28.6
(M) Baskerville	67:0	2069	30.9	Bell	70.5	2010	28.6
Old Face 20	63·o	1944	30.8	Van Dijck	62.8	1792	28.6
Bulmer	64·o	1960	30∙6	Times Wide	76.2	2155	28.3
Caslon	65∙1	1988	30.2	Electra	70.0	1972	28.2
Garamond	65.5	2000	30.2	Pilgrim	71.3	2013	28.2
(L) Baskerville	68∙o	2069	30.4	Poliphilus	66.2	1834	27.7
Old Style No. 2	70.2	2139	30.4	Times	77.0	2111	27.4
Spectrum (12 D)	67·o	2026	30.3	Ehrhardt	69.7	1903	27.3
Centaur	58∙8	1779	30.3	Plantin	76.6	2041	26.7
Estienne	58.7	1779	30.3	Plantin Light	77.0	2041	26.5
Georgian	65.8	1988	30.5				

Table 3 shows how many characters of a number of 12-point founts are likely to be fitted into a 24-pica measure. The table therefore demonstrates

TABLE 3

	ens per		ens per
12-pt. l.c.	24 picas	12-pt. l.c.	24 picas
Estienne	63·0	Caslon	56·4
Van Dijck	62.3	Walbaum (12 D)	55.8
Centaur	61.2	Garamond	55.8
Poliphilus	61.2	Bodoni No. 2	55·1
Bembo	61.2	Caledonia	54 [.] 5
Fournier	61.5	Bell	54.5
Perpetua	60.7	Plantin	53.9
Emerson	60.7	Imprint	53.9
Goudy Modern	6o·o	Plantin Light	53.9
Lutetia (12 D)	59.2	(M) Baskerville	53.3
Georgian	57.5	Bodoni No. 3	52.7
Ehrhardt	57.8	Mod. Ext.	52·I
Pilgrim	57·5	Times	52·I
Romulus (12 D)	56·4	Old Style No. 2	52.1
Spectrum (12 D)	55·8	Scotch No. 2	51.6
Janson	55.2	Scotch No. 1	51·0
(L) Baskerville	55.o	Times Wide	51. o

which series tend, fount for fount, to be more economical in setting than others. The figures of Monotype founts are taken from the Corporation's booklet *Scientific copyfitting*, those for the Linotype from *Linotype copy-fitting tables*. These give the character content of a wide range of measures and of a considerable number of founts for which there is not room here.

§229 · COLOUR

Table 4 shows the result of comparing the first two proportions calculated for each fount, and is intended to demonstrate which founts are the darkest, and which the lightest. The darkest founts tend to have small counters and to be close-fitted; the lightest, to be extremely thin of stroke. If founts of medium weight are the clearest, those at either extreme must be treated with particular care by the designer. Surfaces, processes, and methods must be regulated to prevent any thickening of the darker founts, which would close the already small counters; and to allow of some thickening of the particularly thin strokes of the extremely light founts. For ordinary use, the middle range is probably best, extremely dark or light series being held in reserve for special purposes.

т		DТ	т.	4
1	n	\mathbf{D}	. Ľ	4

12-pt. l.c.	table 1	table 2	ratio	12-pt. l.c.	table 1	table 2	ratio
Bodoni No. 3	4.03	32.7	131.7	Janson	5.83	29.4	171.4
Goudy Modern	4.29	31.0	132.8	Electra	6.09	28.2	171.8
Bulmer	4.57	30∙6	139.8	(M) Baskerville	5.68	30.9	175.5
Plantin	5.40	26.7	144.0	Georgian	5.82	30.2	175.8
Poliphilus	5.34	27.7	148·0	Lutetia (12 D)	6.16	28.6	176.2
Caledonia	5.11	29.8	152.3	Spectrum (12 D)	5.82	30.3	176.4
Ehrhardt	5.62	27.3	153·4	Estienne	5.87	30.3	177.8
Times Wide	5.44	28.3	154.0	Bodoni No. 2	5.48	31.4	181-4
Times	5.40	27.4	1 56·2	Bembo	6.17	29.8	183.8
Plantin Light	5.92	26.5	156.7	Fournier	6.49	28.6	185.8
Emerson	5.48	28.8	157.9	Bell	6.66	28.6	190.6
Imprint	5.28	29.5	164.7	Van Dijck	6.68	28.6	191.2
Scotch No. 2	5.26	31.4	165.2	Romulus (12 D)	6.24	31.0	193.5
Granjon	5.74	28.8	165·4	Old Style No. 2	6.53	30.4	198.5
(L) Baskerville	5.45	30.4	165.7	Walbaum (12 D)	6.59	31.6	208.3
Scotch No. 1	5.35	31.4	168·0	Garamond	6.83	30.2	208:4
Perpetua	5.45	31.1	169.5	Caslon	6.85	30.2	209.0
Bodoni No. 1	5.79	29.3	169.7	Centaur	7.00	30.3	212·I
Pilgrim	6.05	28.2	170.7	Old Face 20	7.25	30∙8	223.2
Mod. Ext.	5.48	31.2	170.9				

That certain types are darker or lighter than others is no news to typographers. But the qualities of different series are usually compared by eye, not by precise measurements and proportions. Final judgement remains with the eye; these figures provide evidence which is better than circumstantial

The first five founts in table 4 may reasonably be considered particularly dark, the last five particularly light; these are founts which require very careful use. So far as clarity of letters is a matter of proportions, those towards the middle of the table are probably the clearest.

§230 · CAPITAL BODY-LINE

Of considerably less importance, but still worth considering, are the proportions of capitals in relation to lower-case letters. Capitals are normally drawn with heavier lines than lower-case letters, but the value of this custom is not evident to all. The comparatively light capitals of the last few founts of table 5 are not generally considered a blemish; but to many readers the heavy capitals of the first few founts may spot the page and spoil the inviting evenness of the setting. The body-line of the lower-case l is compared with that of the capital I, and the founts with the heaviest capitals in proportion to their lower-case appear first. As in table I, the names of the founts with variable body-lines are set in italic.

TABLE 5

	l.c.	cap.		1	1.c.	cap.	
12-pt. l.c.	bod y-line	bod y-line	ratio	12-pt. l.c.	bod y-line	bod y-line	ratio
Old Face 20	8.7	13.7	1.57	Caledonia	13.8	17.5	1.27
Scotch No. 2	13.0	19.4	1.49	Plantin	14.2	18∙1	1.27
Scotch No. 1	13.0	19.3	1.48	Bembo	10.0	12.7	1.27
Fournier	9.8	13.7	1.40	(L) Baskerville	12.5	15.2	1.24
(M) Baskerville	11.8	16·0	1.36	Georgian	11.3	14.0	1.24
Times Wide	14.0	18.9	1.35	Granjon	11.2	14.3	1.24
Caslon	9.5	12.8	1.35	Estienne	10.0	12.3	1.23
Garamond	9.6	12.9	1.34	Bodoni No. 3	15.9	19.3	1.51
Times	13.2	18.0	1.33	Lutetia (12 D)	10.7	12.9	1.51
Bodoni No. 1	10·8	14.4	1.33	Plantin Light	13.0	15.6	I·20
Bell	10.6	14.1	1.33	Ehrhardt	12.4	14.9	1.30
Bodoni No. 2	11.0	14.6	1.33	Emerson	11.1	13.2	1.19
Janson	12.0	16·0	1.33	Romulus (12 D)	10.2	11.8	1.16
Bulmer	14.0	18.5	1.32	Poliphilus	12.4	14.3	1.12
Mod. Ext.	12.5	16.2	1.32	Goudy Modern	14.0	15.8	1.13
Van Dijck	9.4	12.4	1.32	Spectrum (12 D)	11.2	12.9	1.12
Old Style No. 2	10·8	14.0	1.30	Perpetua	10.2	11.7	I · I I
Imprint	12.4	16·0	1.29	Centaur	8·4	9.2	1.10
Electra	11.5	14.8	1.29	Pilgrim	11.8	11.8	I.00
Walbaum (12 D)	9.4	12.0	1.28				

(M) Baskerville

Perpetua

Poliphilus

Georgian

Imprint

67.0

57.2

66.2

65.8

69.2

110.8

93.6

107.8

107.0

112.2

§231 · CAPITAL HEIGHT

Height in proportion to lower-case letters may be just as much a fault in capitals as weight of stroke. In table 6 the x-height of the lower-case letters is compared with that of the capitals, those founts being shown first whose capitals are tallest in proportion.

TABLE 6

12-pt.	l.c. x-ht.	cap. x-lıt.	ratio	12-pt.	l.c. x-ht.	cap. x-lit.	ratio
Estienne	58.7	110.6	1·88	Granjon	66·o	106·0	1.61
Fournier	63.6	110.2	1.73	Ehrhardt	69.7	112.4	1.61
Bodoni No. 1	62.5	108.2	1.73	Centaur	58.8	94 [.] 5	1.61
Old Face 20	63·0	109.0	1.73	Scotch No. 2	68·4	110.4	1.61
Bodoni No. 2	63.6	109-3	1.72	Mod. Ext.	68.5	110.0	1.61
Bodoni No. 3	64·1	109:4	1.71	Scotch No. 1	69.5	110.8	1.59
Emerson	6o·8	103.7	1.41	Bembo	61.7	98∙1	1.59
Romulus (12 D)	63.7	108.3	1.70	Caledonia	70.2	111.2	1.28
Lutetia (12 D)	65.9	111.3	1.69	Old Style No. 2	70.2	110.2	1.57
Janson	70.0	117.5	1.68	Goudy Modern	60∙1	94.3	1.57
Caslon	65∙1	100.0	1.67	Spectrum (12 D)	67·o	104.6	1.26
Bulmer	64∙0	106.2	1.66	(L) Baskerville	68·o	105.2	1.55
Electra	70.0	116.0	1.66	Van Dijck	62.8	96.2	1.23
Walbaum (12 D)	62.0	103.1	1.66	Plantin	76·6	115.5	1.21
Garamond	65.5	108.4	1.66	Plantin Light	77.0	115.6	1.20

1.65 | Bell

Times

Pilgrim

Times Wide

1.64

1.63

1.63

1.62

70.5

77.0

76.2

71.3

106·0

114.0

111.8

103.0

1.20

1.48

I.47

1.44

Low and lightly drawn capitals harmonize with lower-case letters better than do tall and heavy capitals. Unless the capitals of Centaur, for instance, are considered too light to be distinct from lower-case letters, and those of Times Wide too low, capitals need hardly be more heavily drawn than lower-case letters, and may be slightly less than half as tall again as short letters.

§232 · X-HEIGHT

Some 12-point founts are tabulated here in the order of the lower-case x-height. This is a guide to the length of extenders; those founts which are largest on the body, and which here appear first, have the shortest extenders.

TABLE 7

12-pt. l.c.	x-ht.	12-pt. l.c.	x-ht.
Times	77.0	Lutetia (12 D)	65.9
Plantin Light	77.0	Georgian	65.8
Plantin	76.6	Garamond	65.5
Times Wide	76.2	Caslon	65∙1
Pilgrim	71.3	Bodoni No. 3	64.1
Bell	70.2	Bulmer	64.0
Caledonia	70.2	Romulus (12 D)	63.7
Old Style No. 2	70.2	Bodoni No. 2	63.6
Janson	70.0	Fournier	63.6
Electra	70.0	Old Face 20	63·o
Ehrhardt	69.7	Van Dijck	62.8
Scotch No. 1	69.5	Bodoni No. 1	62.5
Imprint	69.2	Walbaum (12 D)	62.0
Mod. Ext.	68·5	Bembo	61.7
Scotch No. 2	68·4	Emerson	6o·8
(L) Baskerville	68·o	Goudy Modern	6о∙т
(M) Baskerville	67·o	Centaur	58.8
Spectrum (12 D)	67·o	Estienne	58.7
Poliphilus	66.2	Perpetua	57.2
Granjon	66·o		

§233 · ITALIC

The qualities most often found useful today in an italic fount are those of an auxiliary rather than those of a type in its own right. An italic can be compared with its roman in various ways, some of which can be measured.

TABLE 8

12-pt. l.c.	ital. body-line	rom. bod y-line	ratio	12-pt. l.c.	ital. bod y-line	rom. bod y-line	ratio
-	•	•		•	•	•	
Caslon	5.2	9.2	1.73	Times	12.0	13.2	1.13
Garamond	7.4	9∙6	1.30	Poliphilus/Blado	11.1	12.4	I·I2
Ehrhardt	9∙8	12.4	1.27	Estienne	9.0	10.0	1.11
Perpetua	8.4	10.2	1.25	Scotch No. 2	11.8	13.0	1.10
(L) Baskerville	10.0	12.5	1.25	Granjon	10.2	11.2	1.10
(M) Baskerville	9.2	11.8	1.24	Pilgrim	10·8	8.11	1.09
Van Dijck	7.6	9.4	1.24	Times Wide	12.8	14.0	1.00
Old Style No. 2	8.8	10.8	1.23	Bulmer	13.0	14.0	1.08
Centaur	6.9	8.4	I·22	Scotch No. 1	12.0	13.0	1.08
Spectrum (12 D)	9.5	11.5	1.51	Georgian	10.2	11.3	1.08
Bodoni No. 2	9.3	11.0	1.18	Emerson	10.4	11.1	1.07
Walbaum (12 D)	8·o	9.4	1.18	Bodoni No. 3	15.0	15.9	1.06
Fournier	8.3	9·8	1.18	Bodoni No. 1	10.2	10.8	1.06
Old Face 20	7.5	8.7	1.16	Caledonia	13.3	13.8	1.04
Bell	9.2	10.6	1.12	Mod. Ext.	12.0	12.5	1.04
Plantin	12.4	14.2	1.12	Imprint	12.1	12.4	1.03
Bembo	8.7	10.0	1.15	Romulus (12 D)	10.0	10.2	1.02
Janson	10.2	12.0	1.14	Lutetia (12 D)	10.2	10.7	1.02
Goudy Modern	12.4	14.0	1.13				

рd

Among these measurable qualities of an italic type, lower-case body-line has been chosen for tabular comparison because it is one of the most variable, one of the most easily compared by calculation, and one of the most difficult to assess accurately by other means. The first types in the table are those in which there is the greatest difference of body-line between roman and italic. In each case it is the roman lower-case I which is compared with that of the italic. As before, founts with variable body-lines appear in italic.

§234 · SMALL CAPITALS

Small capitals appear in both display and text composition; their exact proportions are of more interest where text is concerned. Here they are compared in body-line with their romans, the letters compared being the lower-case I with the small capital I. The first series in the table are those whose small capitals are thickest in proportion to the lower-case. Although small capitals are as a rule rather more strongly drawn than roman lower-case, those of the last three series in this table are actually lighter. Italic type indicates a variable body-line.

TABLE 9

44	rom,	small cap.			fom.	small cap.	
12-pt.	bod y-line	body-line	ratio	12-pt.	bod y-line	body-line	ratio
Van Dijck	9.4	11.0	1.17	Romulus (12 D)	10.3	10.2	1.03
Janson	12.0	13.8	1.12	Scotch No. 1	13.0	13.2	I · 02
Estienne	10.0	11.0	1.10	Centaur	8·4	8.6	1.02
Georgian	11.3	12.3	1.09	(L) Baskerville	12.5	12.8	1.02
Garamond	9.6	10.4	1.08	Bodoni No. 2	11.0	11.3	1.02
Bodoni No. 1	10.8	11.7	1.08	Bulmer	14.0	14.5	1.01
Old Face 20	8.7	9.3	1.07	Bodoni No. 3	15.9	16.1	1.01
Times	13.2	14.5	1.07	Plantin	14.2	14.3	1.01
Times Wide	14.0	14.8	1.06	Perpetua	10.2	10.6	1.01
Mod. Ext.	12.5	13.5	1.06	Imprint	12.4	12.2	1.01
Bembo	10.0	10.6	1.06	Lutetia (12 D)	10.7	10.8	1.01
Caslon	9.5	10.0	1.02	Fournier	9·8	9.9	1.01
Caledonia	13.8	14.5	1.02	Goudy Modern	14.0	14.0	1.00
Scotch No. 2	13.0	13.2	1.04	Old Style No. 2	10.8	10.8	1.00
Emerson	11.1	11.5	1.04	Pilgrim	11.8	11.8	1.00
Walbaum (12 D)	9.4	9∙8	1.04	Spectrum (12 D)	11.2	11.0	0∙96
Granjon	11.5	12.0	1.04	Poliphilus	12.4	11.5	0.93
(M) Baskerville	11.8	12.5	1.03	Bell	10.6	9∙8	0.92
Ehrhardt	12.4	12.8	1.03				

APPENDIX C

Text founts and their relations

This appendix shows the series and sizes of most of the types mentioned in chapter 8; the list was correct in May 1956, and will, of course, become out of date as new founts are added to the existing series. The left-hand column of initial letters indicates whether the series is available on the Monotype, Linotype, or Intertype; the figures in parentheses after the Monotype series are series numbers. Fount sizes set in italic are those for which no italic is available; except in titling or italic series, such as Centaur Titling or Blado, no founts are included unless they have a roman lowercase—48-point Lutetia, for instance, consists of capital letters only and is omitted. Founts followed by an asterisk have alternative long or short extenders; those by a dagger have alternative small and large faces. Founts marked with a D are Didot sizes, and are cast on an English body larger than that of the body-size by which the fount is known; the English body size of any Didot fount should always be checked before use. A thick rule separates composition founts from display founts in the same series. The vertical rules are intended only to clarify the lists, not to provide columns consistent in content.

M Baskerville (169)					6			¦		8	9	91	10	11*	12*	14†
M Baskerville Bold (312)					6				• •	8	9	91	10	11	12	14
L. Baskerville			• •			• • •		• •		8	9	10	11	12	•••	• •
I Baskerville	• •	٠٠.		!	6		• •		• • •	8	9	10 10	11 11	12 12		14
M Bell (341) M Bembo (270)		1 ::	1 ::		6			7		8	9	10	11	12	13	14
M Bembo Condensed Italic						1					ĺ l	10	۱ I	12	13	
(294)	•					İ	' '	,								
M Bembo Bold (428)					6			[8	9	10	101	11	12	13	14
M Bembo Titling (370)		٠			٠.								[• •
L Bernard		,	j		6		• •	• • •		8	9	10	11	12	::	14
M Blado (119)	• •			• • •	• • •			!	, . .	• • •		10	11	12	13	
M Bodoni No. 1 (288)	• •		• •	1				• • •	• • •	8	9	10D 10		12D 12	· · ·	14D
M Bodoni No. 2 (357) M Bodoni No. 3 (135)		::	::		6	61		7*	7 <u>1</u>	8	9*†	10	11*†	12	13	14†
M Bodoni No. 4 (254)			1				!	l		١,.			• • •			
M Bodoni No. 5 (504)	i	i						7		8	9	10		12		
M Bodoni Bold No. 2 (260)			¦		6	61	٠		7₺	8	9	10	11†	12	13	14
L Bodoni				۱	6			7		8		10		12		14
L Bodoni Book					6			7	٠.	8	9	10	٠.	12		14
I Bodoni	٠		• • •							١	ļ	;;	::	::	• • •	
I Bookface Old Style	. • •		• •	• •	٠		• •			8	· ·	10	11	12	•••	• • •
L Bookprint	• •	• •	1	• •	6	! ••		• • •		8	9	10	11	12	• • •	•••
M Bulmer (469) L Caledonia	• •			::	6*	• • •	' !	•••	;	8•	9+	10*	11 11*	12 12*	• • •	14*
M Caslon (128)		1		\ ::		• • •		1		8	9	10	11	12	· · ·	14†
M Caslon Titling (209)			1			! ::	::]]	١.:						::	141
L Casion		1		;	6		! !!			8	9	10	11	12		14
L Caslon Heavy		١										10		12		14
I Caslon	٠				6	¦	٠			8		10	11	12		14
I Caslon Bold					٠.					8	į i	10		12		14
M Centaur (252)	• •				6		• • •		!	8	9	10	11	12		14†
M Centaur Titling (295)		. ••		• • •	·;			٠	• •		٠.,		i ::	::		::
M Ehrhardt (453)	• •			٠٠.	6	••		••		8		10	11	12		14
M Ehrhardt Semi-Bold (573)	• • •	ļ	•		6		• • •	7.		8	9	10 10*	11 11*	12	•••	14
L Electra M Emerson (320)			• •	! ••		::	•		· 	8		10	11	12	•••	14
L Estienne		i ::		1	;;	::		1	::	8	::	10		12		14
M Fournier (185)			i					1	::	8	9	10	11	12		14†
M Fournier (285)		١				١	i		١	١		10	11	12		14
M Garamond (156)			ļ	٠	6	١	٠.	7		8	9	10	11	12	12 D	14†
M Garamond Italic No. 2		ļ	;	٠	6			7	¦	. 8	9	10	11	12	12D	14†
(174)					_	ì	į	_	į	i _	_					١
M Garamond Bold (201)	• •		į ••		6	••	. • •	7		8	9	10	11	12	••	14
L Garamond I Garamond	• •	. • •		• • •	6	٠٠.		• •		8°	9*	10*	11*	12* 12	••	14 *
I Garamond L Georgian	• •		,			· · ·	::			8	9	10	11	12		14
L Granjon		• • •	: ::		6			7	,	8	9	10	11	12	::	14
M Goudy Modern (249)		i	i			1						10	11	12		::
M Imprint (101)	٠	٠			6	6 1		7	i	8	9	10	11†	12		14
M Imprint Bold (310)					6	6 }			١	8	9	10	11	12	131	
M Imprint Bold No. 2 (410)		• •		•••	6		٠.	7		8	9	10	11†	12	131	
L Janson				•••	•••				••	8-	• •	10*	11*	12*	i ··	14*
M Lutetia (255)					6	٠٠.			• •	8D		10D	;;	12D	•••	14D
M Modern Extended No. 1 (7)	••	••		• •			••	7	• •	8	9	10	11	12	• • •	••
M Old Style No. 2 (2)	١	 	١		6	١		7		8	9	10	11	12		14
M Old Face Special (20)	::	::	::	::		61	::	1 7	::	8	9	10	11	12		1
I Period Old Style		1 ; ;	::		6		::		::	8	ģ	10	11	12	::	::
M Perpetua (239)		٠		5 ½	6					8	9	10+	11	12	13	14
M Perpetua Bold (461)			٠.		6					8	9	10	11	12	13	14
M Perpetua Titling (258)				٠.		٠٠.						10	11	12		
M Perpetua Light Titling	¦ ••				• •							• •				••
(480) M Parnetus Rold Titling	İ						İ							,,		
M Perpetua Bold Titling (200)	• • •		• •							٠		• • •	••	12	• • •	••
L Pilgrim	١	İ	١	١	l	۱				ŀ						
M Plantin (110)			::	5}	6	6 <u>1</u>	7	71	7 <u>}</u> D	8	9	10*	11	12	13}	14
M Plantin Light (113)	1	1	::		6		ļ .'.			8		10	11	12		14
M Plantin Bold (194)	١		::		6	61		71	· · ·	8	9	10	11	12	131	14
M Plantin Bold Condensed					6	61				8	ģ	10	11	12	13	14
(236)		1		Ì	i	_				1	l					
M Plantin Titling (438)	· · ·				٠٠.	٠						٠				
M Plantin No. 2 (281)	¦ ••			•••	• •	٠.	••			٠٠.	9	٠	11			
																· _

Italic numerals - no italic available. * Alternative

M Parkerville (160)	16	1.0	1 22	24			10		1 -4	20	26				
M Baskerville (169) M Baskerville Bold (312)	16	18	22	24	14 14	••	18 <i>18</i>	• •	24 24	30 30	36 36	42	48	60 60	72
L Baskerville									2 4				40		
I Baskerville															::
M Bell (341)					14		18		24	30	36		1	;;	
M Bembo (270)	16	18		24	14	16	18	22	24	30	36	42	48	60	72
M Bembo Condensed Italic	16		١	٠.	• • !				٠						٠.,
(294) M. Bernho, Bold (428)	16	18											1	i	-
M Bembo Bold (428) M Bembo Titling (370)	10	10	• •		• •	'	• •	• • •		20	36	42	• •	••	٠.
L Bernard	٠. ا	1	• •				• • •	• •	24	30	36			• •	
M Blado (119)	16					• • •	• • • • • • • • • • • • • • • • • • • •		24	• • •			i	• •	
M Bodoni No. 1 (288)	٠. '										- : : !				
M Bodoni No. 2 (357)	!				;										١
M Bodoni No. 3 (135)	16	18		24	14	16	18	22	24	30	36	42	48	60	, 72
M Bodoni No. 4 (254)	• •	• •		• •	• •	• • •	18		24		36		• •		
M Bodoni No. 5 (504)	• •	• •	• •		14	• •	18			30	36				
M Bodoni Bold No. 2 (260) L Bodoni		18	• •	24				22	24	30 ±	36 36	42	48 48	60	72
L Bodoni Book		10	: ::				• • •						40		
I Bodoni												· ::			::
I Bookface Old Style					• •					::			::		
L Bookprint	• •								• • •]				
M Bulmer (469)				٠				• • •	• • •	• • •			• • •		
L Caledonia	• •			244	14			• • •			::	::			
M Caslon (128) M Caslon Titling (209)	• •	18	20	24†	14	• • •	18 <i>18</i>		24 24	30* <i>30</i>	36 <i>36</i>	42	48	60	72
L Casion	• •	18	21	24					24	30	36				72
L Caslon Heavy		18		24						30	36				
I Caslon				24											'
I Casion Bold		18		24						30					
M Centaur (252)	16	18	22	24	14	16	18		24	30	36	42	48	60	72
M Centaur Titling (295)	• •	• •	٠.		• •)	60	
M Ehrhardt (453)	• •	• •	• • •		• •	• • •	18	٠٠.	24	i • •	• • •	• •	(٠٠ ا	
M Ehrhardt Semi-bold (573) L Electra	• •		• •	• •			• •	• • •	• •	• •	• •	• •	• •		• • •
M Emerson (320)	• •	••	• •	• • •		• • •	18	٠.,	24	• •	• •	• •	• •	•••	
L Estienne	16	18		24	l ::						• •	• •	• •	i	i
M Fournier (185)	:				14		18		24	. 30	36	42	48		
M Fournier (285)				١				٠							
M Garamond (156)	16	18		24	14	16	18	22	24	30	36	42	48	60	72
M Garamond Italic No. 2	• •	18		24	14		18		24	30	36	42	48	60	72
(174) M Garamond Bold (201)		18		24	14	16	10	22	24	30	36	42	48	60	72
L Garamond		10	• • •	. 24		. 10	18			; 30	30	42	ļ	ł	ì
I Garamond	::	18	: ::	24		• • •		::		::	36	• • •	::	::	::
L Georgian					1								1		::
L Granjon	16	18		24					١	30	36	42	48		
M Goudy Modern (249)		••		::	14	• •	18		24	30	36	42	48		
M Imprint (101)		18		24	14	16	18	20	24	30	36		48		
M Imprint Bold (310)	• •	• •	• • •		• •	• •	• •	• • •	• • •		• •	• •			
M Imprint Bold No. 2 (410) L Janson	• •	• • •		٠.	• •	• •			•••		• •	• •		٠٠.	
M Lutetia (255)	16D		20E)							28D	36 D			•	
M Modern Extended No. 1		; ;						· · ·	i ::		3015		::	! ::	
(7)			1												
M Old Style No. 2 (2)		١			'				٠	i ¦		• • •			
M Old Face Special (20)															٠.
I Period Old Style	• •	;;			14		10	• •	34		;;	43	40	2.5	-:
M Perpetua (239)	• •	18			14 <i>14</i>	16	18 18	• •	24	30 30	36 <i>36</i>	42 42	48 48	60	72
M Perpetua Bold (461) M Perpetua Titling (258)		· ·			14	10	18 !8	• • •	24	30	36	42	48	60	72
M Perpetua Light Titling	• •		! ::		14		18		24	30	36	42	48	60	72
(480)	•	i	١	'	l .	١			i	50					~~
M Perpetua Bold Titling (200)					14		18	••	24	30	36	42	48	60	72
L Pilgrim			i :	١	١			١.	i					١	
M Plantin (110)	•••	18		24	14		18	22	24	30	36	42	48	60	72
M Plantin Light (113)		18	• • • • • • • • • • • • • • • • • • • •	24	14		18		24	30	36	42	48	60	72
M Plantin Bold (194)	!		١		14		18	22	24	30	36	42	48	60	72
					14		18	22	24	30	36	42	48	60	72
M Plantin Bold Condensed	• •														
(236)	••		ĺ												
													::		72

extenders. † Alternative face sizes. D - Didot body.

L Plantin	١	۱	١	١ ا	6		١ ٔ	7	١	8	9	10	11	12		١
I Plantin					6			١		8	9	10	11	12		14
M Poliphilus (170)	::	::		::						١	i	10	11	12	13	-:
M Poliphilus Titling (230)	``.	::	::							::	::					
M Romulus (458)	'	::	```					::	::	8D	9D	10D	;;	12D		14D
M Romulus Bold (520)										8D	9D	10D		12D		
M Scotch Roman No. 1 (46)			i		6*		7	7D	::	8	9+	10	11	12		
M Scotch Roman No. 2 (137)							٠.			8	9	10	11	12		14
L Scotch No. I	1			١	6					8	9	10	11	12		
L Scotch No. 2				1	6					8	9	10	11	12		14
I Scotch	1	١		١	'			٠		١			١			
M Spectrum (556)			i	i	6D					8D		10D		12D		١
THE TIMES FAMILY	1		l	1						ļ						
	İ.,.	_			_	٠.,		_			١		٠			
M New Roman (327)	41*	5	5D		6	61	6D	7	71.*	8*	9•	10*	11*	12*		14*
M Bold (334)		• •		51/2	6	•••	6D	7	71/2	8	9	10	11	12		14
M New Roman Wide (427)	• • •	· · ·	i			• • •	• •	7	•••		9	10	11	12	::	14
M New Roman Book (627)	• •	!				٠	• •		7 <u>1</u>	١		10	11	12	14	14D
M New Roman Semi-Bold		• • •		· · ·	6	61	• •	7		8	9	10	11	12	• •	
(421)		!		İ							1		!			۱.,
M Titling (329)		• • •					• •			• •		٠٠.			• •	14
M Bold Titling (332)				٠٠.	• •		• •	٠.	١		٠	::	l ::	::		• • •
M Bold Titling No. 2 (328)						• • •	• •	· · ·		8	9	10	11	12		1 ::
M Extended Titling (339)			٠.٠	• • •		٠.		7	· · ·	8	9	10	11	12	• •	14
M Hever Titling (355)	٠	1	1	::	٠. ا	٠٠.	• •	٠	<u>:</u> :	١	9	10	11	12		• •
L New Roman	41	• •	· · ·	51	6	٠٠.	• •	7	71	8	9	10	11	12	• •	• • •
L New Roman Bold	· · ·			51/2		٠٠.	• •	7		8	9	10	11		• •	• •
I New Roman		• • •		• •	٠.	٠٠.	• •	• •		• •			••	• • •	• •	• •
I New Roman Bold	• • •			• •	٠.	• • •	• •						• • •	• • •	• •	• • •
	1	!								! :	1	ļ				
M Van Dijck (203)					l			7*		8*		10*	11*	12	13	14
M Walbaum (374)					6D			¦		8D	9D	10D	11D	12D		14†
M Walbaum Medium (375)					6D		• • •	••		8D	9D	10 D	IID	12D	••	14†

Italic numerals - no italic available. * Alternative

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L Plantin				١					١						
1 Plantin								١		١					
M Poliphilus (170)	16										٠				
M Poliphilus Titling (230)							18		24						
M Romulus (458)	16D		20D	۱		16D		20D	24D	28D	36D		48D	60D	
M Romulus Bold (520)													١		
M Scotch Roman No. 1 (46)															
M Scotch Roman No.2(137)		18		24	14		18		24	30	36	42	48		
L Scotch No. 1	٠								١						
L Scotch No. 2		18	· · ·	24		١				30	36	42	48		
I Scotch															
M Spectrum (556)												• •		٠	٠
THE TIMES FAMILY															
M New Roman (327)		٠	١ ا		14*	16	18*	20	22	24*	30	36	48	60	72
M Bold (334)					14		18	١	24	30	36	42	48	60	72
M New Roman Wide (427)			١ ا	٠.	14		18	22	24	30	36		48		
M New Roman Book (627)					,,		• •	20	24						
M New Roman Semi-Bold			١ ا				18	١	24	١	36		48		١
(421)															
M Titling (329)				٠	14	16	18		24	30	36	42	48	60	72
M Bold Titling (332)			l !			l l	18		24	30	36		48	60	72
M Bold Titling No. 2 (328)					14		18	!	24	30	36	42	48	60	72
M Extended Titling (339)			ĺ l		14	16	18		24	30	36	42	48	60	72
M Hever Titling (355)			۱		14		18	'	24	30				١	
L New Roman										١					٠
L New Roman Bold															
I New Roman															
I New Roman Bold	٠.	• •								٠٠.					٠.
						ļ									
M Van Dijck (203)	16	18				16			1					,	
M Walbaum (374)	16D				14	16D		20D	24D	30D	36D		48D		
M Walbaum Medium (375)	16D		١		14†	16D		20D	24D	<i>30</i> D	36D		48D	60D	72
		1	1										I		

extenders. † Alternative face sizes. D - Didot body.

APPENDIX D

Colour analysis and synthesis

§235 · LIGHT AND COLOUR

Colour is a sensation of the eye stimulated by light. By the use of a prism, white light can be separated into its components, which are lights of various colours. Examples of this phenomenon are familiar and remind the observer that sunlight contains all the colours of the rainbow.

Visible light is a form of radiation within a certain limited band of wavelengths. The colour of any light radiation is determined by its wavelength, or by the different wavelengths of which it is composed. Most coloured light reflected from material under natural conditions is a mixture of wavelengths, with one predominant over the rest. The complement of a particular coloured radiation is produced by the combination of all the other radiations in the spectrum of white light. The spectrum of any kind of light is its composition in terms of wavelength (and hence of colour).

Between the shortest of visible light radiations and the longest—that is, between the deepest violet light and the deepest red—lie the colours of the rainbow, the spectrum of white light. For the purpose of photography and reproduction, this spectrum can be divided into three main groups of colours. The predominant colours of these three groups are the so-called primary¹ light or additive colours, blue-violet, green, and red.

§236 · LIGHT AND SUBSTANCE

The transparency of a substance is the degree to which it permits the passage or transmission of light. The transmission range of a substance is the wavelength band or bands of the incident light which it transmits. Red glass, for instance, transmits more of the radiations at the red end of the spectrum, and much less, if any, of the shorter radiations.

Any transparent substance absorbs some light of all colours, and this loss of intensity on transmission through lenses and half-tone screens is one of the reasons why retouching is necessary to the reproduction of monochrome continuous tone, and to that of continuous colour. Clear

¹ Blue, red, and yellow are known to painters as primary colours, in the sense of simple or fundamental coloured *materials*.

glass transmits a high proportion, but not all, of the incident light without changing its composition, so that the colour of the light remains unaltered. The absorption range of a substance is the wavelength band or bands of the radiations which it absorbs. Red glass, for instance, absorbs most of the green, blue, and violet radiations; a blue object, seen through red glass, therefore appears to be black—black, of course, being the effect produced by the complete absence of light.

Light which is neither transmitted through nor absorbed into a substance is reflected from it. Every visible substance reflects some light, and in the case of comparatively opaque materials the wavelength of this reflected light determines the colour of the substance. All material substances, moreover, absorb some of the incident light. No red surface, for instance, can be made to reflect or transmit all the red radiations which fall on it. The apparent colour of reflected light often tends to be diluted or rendered less saturated by the reflection from the same surface of a proportion of unchanged white light; the greater the proportion of white light reflected from a surface, the paler its colour becomes. The colours of reflected light therefore tend to be less pure and bright than those of transmitted light.

§237 · ANALYSIS AND SYNTHESIS

The accurate analysis of white light into single radiations is prismatically possible, but of no direct value to the printer. Instead, the colours of a picture to be reproduced are separated only into the three primary wavelength groups. This is done by photographing the picture three times, through each of three transparent colour-filters whose respective transmission ranges approximate to one of the so-called primary light colours. Light from correspondingly coloured areas of the original passes through the respective filter during each of the three photographic exposures.

The method of analysis clearly determines the method of synthesis, but synthesis can be carried out in one of two ways. Additive synthesis is the mingling of coloured *lights* to produce light of the required colour; blue-violet, green, and red for instance, the primary light colours, will if mingled produce white light. Subtractive synthesis is the mingling of the absorption ranges of *material substances* to absorb all colours not required in reflection or transmission; unwanted colours, in fact, are subtracted from the reflection or transmission.

Analysis and synthesis are necessary because by techniques now known one coloured ink only can be printed at each impression, and the number of printings economically possible is naturally limited. The reproduction of continuous-colour originals, then, is achieved by photographic analysis of the subject into the primary light colour groups, and by synthesis in printing with coloured inks complementary to the primary light groups. Since the inks are complementary to these primary light colours by which the total spectrum is separated into three groups, each ink reflects or transmits two-thirds of the spectrum radiation. For this reason the radiations of the inks overlap each other and it is this overlapping, when the inks are superimposed, which produces colours different from those of the inks themselves.

§238 · PHOTOMECHANICS

Trichromatic reproduction is based on the use of three transparent coloured filters. One is coloured blue-violet, and it absorbs most of the green and all the yellow, orange, and red radiations from the original. The second is green, and this absorbs the wavelengths at each end of the spectrum, comprising violet and blue at one end, orange and red at the other. The red filter absorbs the violet, blue, green, and yellow radiations.

The more intense the light transmitted through the filter, the more opaque it renders the negative; the less intense areas of transmitted light leave the negative comparatively transparent. The more transparent parts of the negative therefore correspond with those areas of the original whose colour is absorbed by the filter. Since the printing-surface will be produced from the more transparent parts of the negative, it will correspond in position and area with the absorbed colours.

The printing-surface made from each of the negatives is therefore used to convey to the paper ink whose reflection range is approximately complementary to the transmission range of the filter through which the negative was made. The printing-surface made from the blue-violet filter is used with yellow ink: that from the green filter, with a bluish red or magenta: that from the red filter, with blue-green or cyan ink.

§239 · COLOUR MIXING

The colour of an ink is naturally governed by its reflection range. If two inks of different colours are printed on the same part of the paper, their absorption ranges are combined, and the reflection resulting from their combination consists of the unabsorbed radiations. The cyan or blue-green ink used in trichromatic printing absorbs most of the orange and red radiations: the yellow ink absorbs nearly all the violet and blue radiations: the strongest group of radiations remaining unabsorbed by either is the green, and it is green that is reflected from a combination of cyan with yellow ink. Magenta, or blue-red ink, absorbs most of the green radiations: cyan absorbs the red group of radiations that would otherwise be

reflected from the magenta: so that when magenta and cyan are printed together, it is the unabsorbed blue group of radiations in each which combine to produce blue-violet. When magenta and yellow are printed together, the yellow absorbs the blue group of radiations that would otherwise be reflected from the magenta, and the result is an orange-red. When all three trichromatic inks, magenta, cyan, and yellow, are printed one over the other, they combine (in theory at least) to absorb all radiations, and to reflect so little that the result is black. By printing and overprinting in solids, therefore, the trichromatic inks can produce eight colours—cyan, magenta, yellow, green, blue, violet, red, and black.

By adjusting the relative quantities of the different inks in a trichromatic combination, the range of colours reproduced can be increased. Thus, when cyan and yellow are combined, if the cyan is reduced in quantity, say by being printed in half-tone instead of solid, it will absorb less red; and the resulting green will be a more yellow green. Overprinting green with a magenta tone can produce such colours as brown, which result from the absorption of much of the whole range of radiations, and cannot themselves be reduced to single radiations. Colour correction of photographic and printing plates is called for because, as indicated on p. 249, the best available pigments for printing inks fall short of theoretical requirements. By adjustments of this kind the trichromatic method can reproduce most of the colours seen in nature.

BOOKS

HARTRIDGE, H. - Colours and how we see them - Bell, 1949 - illustrations.

SPENCER, D. A. - Colour photography in practice - Pitman, 3rd, revised, edition 1952 - quarto: illustrations: bibliography.

APPENDIX E

Book lists

These three lists supplement those at the end of some of the preceding chapters. The first contains a number of titles in which the illustrations may be said to be the main part of the book, or in which the text, although valuable, does not refer to any chapter in particular.

The second is mainly a list of bibliographies. These, together with the bibliographies in many of the books already mentioned under chapters, show something of the extent of printing literature, but do not cover the whole ground.

Since the incidence of illustration, the method of binding and even the format of journals tend to change from time to time, these details are not included in the third list.

§240 · EXAMPLES OF BOOK DESIGN

- ANONYMOUS Modern book production Studio, 1928 quarto: illustrations.
- ARMITAGE, MERLE Notes on modern printing Hollywood, 1945 illustrations. [Deals mainly with the author's own work in unconventional styles of book design.]
- DREYFUS, JOHN The work of Jan Van Krimpen: a record in honour of his sixtieth birthday: illustrated by reproductions of drawings, specimens of type, lettering and bookwork Sylvan Press, 1952 quarto: illustrations.
- EDE, CHARLES (editor) The art of the book: some record of work carried out in Europe and the U.S.A., 1939-1950 Studio, 1951 quarto: mainly illustration.
- HOLME, CHARLES (editor) The art of the book: a review of some recent European and American work in typography, page decoration and binding Studio, 1914 quarto: mainly illustration.
- JOHNSON, A. F. One hundred title-pages, 1500-1800, selected and arranged with an introduction and notes - Bodley Head, 1928 - quarto: illustrations.
- LEE, MARSHALL (editor) Books for our time New York, 1951 quarto: illustrations. [The case for unconventional style in book design.]
- MORISON, STANLEY Four centuries of fine printing: upwards of six hundred examples of the work of presses established during the years 1500 to 1914 Benn, 1924 folio: mainly illustrations. [A most valuable book for the student of the history of type design and of style in book typography, with full-size illustrations in colour collotype.]
- MORISON, STANLEY Modern fine printing: an exhibit of printing issued in England, the United States of America, France, Germany, Italy, Switzerland, Czecho-Slovakia, Holland and Sweden during the twentieth century and with few exceptions since the outbreak of the war Benn, 1925 folio: mainly illustrations. [A continuation of Four centuries, above.]
- MORISON, STANLEY Four centuries of fine printing: two hundred and seventy-two examples of the work of presses established between 1465 and 1924 Benn, 1949 mainly illustrations. [A revised cheap edition of the similar title above, with plates in single-colour letterpress half-tone.]

- NEWDIGATE, B. H. The art of the book Studio, 1938 quarto: illustrations and inserted examples.
- ROSNER, CHARLES The growth of the book jacket Sylvan Press, 1954 mainly illustrations. SYMONDS, A. J. A., DESMOND FLOWER, and FRANCIS MEYNELL The Nonesuch century: an appraisal, a personal note and a bibliography of the first hundred books issued by the Press, 1923-1935 Nonesuch Press, 1936 folio: inserted examples and illustrations. [The inset examples are printed pages from the books of the Press, and demonstrate paper and presswork in a manner impossible for reproductions.]
- TSCHICHOLD, JAN Designing books New York, 1951 folio: mainly illustrations. [The examples are from the work of the author.]

§241 · BIBLIOGRAPHY AND BIBLIOGRAPHIES

- BIGMORE, E. C., and C. W. H. WYMAN A bibliography of printing, with notes and illustrations (3 volumes) Quaritch, 1880-8. [The recent reprint is a photolitho facsimile, and includes no alterations.]
- BLAND, DAVID A bibliography of book illustration (The book, number 4) Cambridge University Press, for the National Book League, 1955 pamphlet.
- FREER, PERCY Bibliography and modern book production: notes and sources for student librarians, printers, booksellers, stationers, book-collectors Johannesburg: Witwatersrand University Press, 1954 typewriter facsimile, limp paper.
- HASSALL, JOAN Wood engraving: a reader's guide Cambridge University Press, for the National Book League, 1949 pamphlet.
- HOBSON, A. R. A. The literature of bookbinding (The book, number 2) Cambridge University Press, for the National Book League, 1954 pamphlet. [Deals mainly with the history of bookbinding as an art.]
- Mckerrow, ronald B. An introduction to bibliography for literary students Oxford, at the Clarendon Press; 2nd impression, with corrections, 1928. [Contains much of interest about the history of book production, and shows how the bibliographer uses this knowledge to establish a correct text of the books he studies.]
- MORISON A handlist of the writings of Stanley Morison, compiled by John Carter with some notes by Mr. Morison Cambridge University Press, privately printed, 1950: not for sale.
- NATIONAL BOOK LEAGUE Books about books: catalogue of the library of the National Book League - Cambridge University Press, for the National Book League, 1955 - limp paper.
- OVER TON, JOHN A bibliography of paper and paper-making (The book, number 3) Cambridge University Press, for the National Book League, 1955 pamphlet.
- RANSOM, WILL Private presses and their books New York, 1929 illustrations: bibliography.
- ST. BRIDE Catalogue of the technical reference library of works on printing and the allied arts St. Bride Foundation, 1919. [Arranged alphabetically under authors' names. A supplement for 1920-50 is in preparation.]
- ST. BRIDE Catalogue of the periodicals relating to printing and allied subjects in the technical library of St. Bride Institute St. Bride Foundation, 1950 quarto: pamphlet.
- TOMKINSON, G. S. A select bibliography of the principal modern presses, public and private, in Great Britain and Ireland First Editions Club, 1928 illustrations.
- ULRICH, CAROLYN F., and KARL KÜP Books and printing: a selected list of periodicals, 1800–1942 New York, 1943.
- WILLIAMSON, HUGH Book typography: a handlist for book designers (The book, number 1) Cambridge University Press, for the National Book League, 1955 pamphlet.

§242 · PERIODICALS

ALPHABET AND IMAGE – edited by Robert Harling – Shenval Press, numbers 1–8, 1946–8. [Successor to TYPOGRAPHY, below.]

- BOOK PRODUCTION edited by Frank B. Myrick New York, monthly since 1925. [Until 1955 named BOOKBINDING AND BOOK PRODUCTION. A trade journal.]
- FLEURON, THE: A JOURNAL OF TYPOGRAPHY volumes 1-4, 1923-5, edited by Oliver Simon, published by The Fleuron: volumes 5-7, 1926-30, edited by Stanley Morison, published by Cambridge University Press. [Contains illustrated articles of the first importance on typography and its history.]
- GUTENBERG JAHRBUCH edited by Aloys Ruppel Mainz, since 1926. [Each article is published in the language of its writer.]
- IMPRINT, THE edited by Gerard Meynell, F. Ernest Jackson, J. H. Mason, and Edward Johnston Imprint Publishing Company; numbers 1-9, 1913.
- LINOTYPE MATRIX a journal published from time to time by Linotype and Machinery Ltd. since 1938.
- MONOTYPE RECORDER, THE Monotype Corporation: at irregular intervals since 1902. [Since the early 1920's, the Recorder has published many important articles on type design.]
- PENROSE ANNUAL: A REVIEW OF THE GRAPHIC ARTS first published 1895: now edited by R. B. Fishendon, and published by Lund Humphries. [Summarizes technical as well as artistic developments.]
- PRINT: A QUARTERLY OF THE GRAPHIC ARTS edited by Lawrence E. Andrain New Haven, U.S.A., since 1940. [Concerned with printing as an art.]
- SIGNATURE: A QUADRIMESTRIAL OF TYPOGRAPHY AND GRAPHIC ARTS edited by Oliver Simon Curwen Press: 1st series, 1935-40: 2nd series, 1946-54. [Includes important historical material.]
- TYPOGRAPHY edited by Robert Harling Shenval Press: 8 numbers, 1936–9. [Succeeded by ALPHABET AND IMAGE, above. Deals lightly with a wide variety of printing subjects.]

See also, in § 241, ST. BRIDE (Catalogue of periodicals) and ULRICH.

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June 1956 H. W.

Index and glossary

abbreviations 126 193 absorption range 400 accents 38 54 355 acknowledgements 194-5 advertisement 173 194 air-brush 280 Albertus 152 albumen plate - photo-litho plate with image developed on grained surface - 236 Aldis, H. G. - The Printed Book - 117 Aldus (Manutius), romans of 78-9 83, & Caslon 86, & Baskerville 88, & dedication alphabet - set of letters of the same kind from a to z - 37 39 48 American joint - deep groove between board and spine: also French groove - 325 American Typefounders 148 152 Angström units 246 Antigone 150-1 antique (paper) - moderately bulky, opaque paper with matt or rough surface - 295-6, & inking 223, & beating 287, featherweight appendix 138 192 Arabic 58-9 61 355 arbitraries - see special sorts Arrighi - italic of Centaur - 77-9 art (paper) - fibre core with mineral coating: see also imitation & matt art - 297-8, & type 71 81 92 106, & title-page 186, & halftone screen 206, & inking 223, & photolitho 236, & collotype 239, & gravure 242, & printing processes generally 243, & colour 253-4, & tone illustration 280, body paper for 284, brush-coated, machine coated & matt 292 298, enamel 292, finish of 301, & folding & endpapers 313, & jacket 341, & wastage 358 artist-see also illustration, lettering & originals - & display 153, & title-page 184, & colophon 197-8, & fine-etching 207, & stone litho, 233 254, & transparent originals 237, & colour mixing 248-9, & colour originals 256-7, & illustrations 275, & autographic. illustration 276-7, & photomechanical illustration 277, & line illustration 278, & jacket 338, & typescript 340, & fees 356-7 ascender - stroke rising above main body of letter: see also ascending letters & extender diagram 34, defined 37, long 39, value of 66 ascending letters - letters having ascenders: sec also ascender and extender - 33-4 Austin, Richard 93 96-7

author – see also typescript – suggestions for 10-11, & verse 122, & punctuation 126, & extracts 129, & notes 132, & additions in proof 134, & headlines 135-6, & device 182, & name on title 182-4, list of works by (advertisement) 173, & style of prelims 190, & illustrations 261, & jacket 337, & even working 349, & corrections 356, & specimens 368

autographic illustration – print from surface

autographic illustration – print from surface prepared by artist: see also autolithography, lino cut, wood-cut, wood-engraving – 276-7, & printing-surface 214, defined 237, and relief processes 252, lithographic 254, & colour 257, & artist 260

autolithography – printing from image drawn on stone by artist – 254 276

В

backing (in binding) - spreading spine of book outwards to form hinge - defined 23, & margins 26, & double-spread title 180, & illustration 267, & hand-binding 308, & case binding 318-9 332

backing up - printing the second side of the sheet - 118 220 222

back pages - pages which follow main text -110 171-99 312

Ballé 154 Barbou 92 note

Barlow, A. E. 154

baryta - paper which although opaque can be used as photographic transparency - 237

Baskerville, John 90 93 97 144 148

Baskerville (type) 88-9, 396-407, examples 36 46 135, & paper 71, popularity of 86 note, width of 106, measurements 396

batter - dent accidentally caused in printingsurface - 212 360

Bauer Foundry 100 148 152 154 156

beard – space between lowest part of printingsurface of non-descending letters and front of shank – 33 140 143 152

Beardsley, Aubrey 279

beating – splitting and cutting fibres in papermaking – 286-8

Begg, John – 174-5

Bell 93 396-407, set 54 note, capitals 67, use of 86 note, example 121

Bell, John 93 96

Bembo 78-9 396-407, popularity of 86 note, & interlinear space 118, titling 152, example

Ben Day - see mechanical stipple bookseller & shape of book 69, & colophon 199, Bernard 80 404-7 & jacket 340, & form of book 374: Bookseller, The 393-4 Berthold Foundry 94 148 Bewick, Thomas 90 border - here, decorative type units: see also Bible, the 104 296 299 fleuron - in line-casting 51, on Monotype biblio - bibliographical details of edition - 158 58, in headline 137, & rules 144-5, examples 147 149 189, & title-page 168 bibliographer, bibliography 139 193-4 bourgeois - approximately 6-point - 32 Bill, Max 28-9 boxes 342-3 brace - { - 122 binder & colophon 198, & imposition 217, & estimate 358 361, printer as 366, & specibracket - in fount, [: here, in type-face, supmens 368, & advance copy 370: binding porting stroke between serif and mainstroke - 34, 66, 123, 238 305-34, & margins 26-7, & rebinding 139 166, & paper grain 300, cased 306 310-31, brass - blocking surface engraved in brass limp 322, spiral 332, & estimating 360-1 326-7 361 370 Black Letter, origin of 4, use of 62, & legibility breaking - separating fibres in paper-making -286-7 68, & roman 84, & spine 330 Blado - italic of Poliphilus - 79-80 264-5 401 brevier - about 8-point - 32 Brinell test - test of metal hardness by measur-404-7 ing dent caused by measured impact - 211-3 blank pages 349 bleach 285-6 296 British Letter Foundry 96 British Museum 356 bleed - of an illustration, to extend beyond cut British Standards sheets sizes 13, trichromatic edge of page - & imposition 217-9, effects of 266, & paper 298 358 inks 250 253 block, to - impress into cloth or other surface broadside - full size of sheet - 15 - 326-8, & cloth 322-4, & hollow 325, Broadwater Press 154 blind 327, & estimating 361, in use 370: bronzing - printing metallic inks by dusting block - relief printing surface, here photoon to a prepared surface - 251 272 buckram - 322-3 graphically produced: see also etching, halftone & line-block - 200-9, & duplicate bulk - of book or paper, thickness - & typeplates 214, thickness of 216, & make-ready face 69, & paper 105, & featherweight 283, & loading 288, & folding 298, & sales 230-1, & collotype 239, & bleed 266-7, & jacket 338, charging for 360, for colour 299, & paper finish 301, & other paper printing 367 qualities 302, & board 321, & jacket 340, & format 374 Blumenthal, Joseph 100 blurb - summary of and advertisement for Bulmer 90 396-407 book and author, usually on jacket and Bunyan 104 sometimes in prelims as well - 338 341 Burt, Sir Cyril 67 note, 72 note, 108 note, board - see also chipboard & millboard - & 111, 117 note handbinding 308, & case binding 320-1, bevelling 321, & cutting 325, & blocking C 328, supply of 359 Bodoni, Giambattista 94-6 293-4 Caledonia 90 396-407 Bodoni (type) 65 71 94-6 395-407 calenders - smoothing rollers - & look-through 285 290-1, & antique 296, & plate paper body - depth of shank from front to back: see also Didot - defined 32, in line-casting 50, 297, & finish 301 old sizes 57 150-1, & leading 117 calligrapher & title-page 186, & display 153 bod y-line - thickness of thickest part of letter 156-7 159, & captions 275: calligraphy 281 - 15 83 95–6 399 401–2 Cambridge University Press 183: see also bold - type not designed for sustained reading University Press, Cambridge & having very thick strokes in relation to Cancelleresca Bastarila 101 height - 41, in line-casting 49, in matrixcanon – about 48-point – 86 case 54, on Monotype 58, design of 64, bold canvas - 323-4 327 condensed 101, & headings 133 158, in cap - see capitals family 155 Cape, Jonathan 127 bolt - folded edge at head and tail of folded capital - see also small capital - 129-32, section - 14 311 318 roman and italic 36, & lower-case 66-7 158, Bookface Old Style 98 404-7 proportions of 99, in verse 119 122, in headbookmarker - also register - 319-20 lines 136-7, & initials 140, in display 156, & Book print 98 404-7 legibility 160, & interlinear space 164, & list of contents 188, & indention 193, & spine 330, & cast-off 346, & body-line 399, &

x-height 300-400

caption - also underline - 274-5, & typing 11, & frontispiece 176, & list of illustrations 190, & flange 208, & collotype 243, & text area 277, & margins 273, & calligraphy 281

carbon tissue 240

caroline minuscule 58

Carter, Harry 84: Carter, Will 152

cartridge - unbleached or semi-bleached paper - 285 296 341

case (of type) 41: (of binding) - cover of cloth and board etc - 320-1 324-31

casing in 330-1

Caslon 40-1 85-8 396-407, & paper 71, different founts 73 153, & Baskerville 89, & Pickering 97, capitals of 99, italic 106, example 112, original roman 148

Cassell & Co 183

casting faults 48 57 368-9, in line-casting 49-50, in single type casting 57, & metal 211 casting off - counting length of copy & calculating its length in type - 344-50 367

catchword - characters which identify title to which section belongs - 130 360

cellulose 283-4

Centaur 76-9 396-407, caps & lower-case 66-7, x-height 117, asterisk 130-1, examples 140-1, & casting off 347

centred lines in display 162, in list of contents 188, & colour 247, & captions 275, & jacket 340

chain wires - thicker wires on dandy for making laid paper - 289

chancery italic - italic derived directly from chancery writing of 15th and 16th centuries - 77-8 99 104

Chappell, Warren 152

chapter numbers 188: chapter headings - see under headings

chase - metal frame which contains type during printing - defined 42, bars 42 219 230, & imposition 217 359

Chinese 59

chipboard - cheap cardboard made from chips - 320-I

Chisel 155

chromo - coated paper with thicker and duller coat than art paper - 284 293 298

chromolitliography - lithography in which original is redrawn on plate by printer - 237 note, 254

Civilité 156

Clerc, L. P. 250-1

cloth 321-4, introduced 97, & colophon 198, half-tones on 235, choice of 305, & edge colouring 320, & bevelling 321, making of 321, & case 325-6, 332, & blocking 326-7, & printing 329, & estimating 358-9, & specimens 368, in use 370

coated papers - see also art paper - 207-8

Cochin 150-1

Coleman, Morris 178-9

collating - checking completion & correct order of gathered sections - 317

Collins, F. Howard - Authors' & Printers' Dictionary - & quotes 125 note, & punctuation 126 128 note, 129, & page numbers 137, & prelims 171, & list of contents 187, & appendixes 192

collography - collotype with celluloid base instead of glass - 239

collotype - printing from bichromated gelatine on glass base - 238-9, use of 243, & colour 255, & set-off 272, & illustration, 278-81, & paper 296 301

colon 128

Colonna 155

colophon - setting which gives details of book's production, publication etc - 161 106-0

colour 245-59, on title-page 184-5, & imposition 218, & register 222, & ink 223-4, & photo-litho 234-5 243, & gravure 242, correction 250 252-6, separation 254 256-7, & diagrams 262, & reduction 270, & metal engraving 276, & autographic illustration 277, & paper 290 292 297 303, & binding 314 320 322-3 328, & jacket 337-8, & cover 339-40, & laminating 342, & paper wastage 357, & estimating 357 360, & type 398-9, analysis & synthesis 408-11: complementar y colours - colours which together contain all the colours of the spectrum -408, 410

columns, setting in two 21 69 110 112, in drama 123, notes 132 193, abbreviations 193, index 195, captions 275

composing machines - see also Intertype, Linotype, Ludlow, Monotype - 43-61: composing stick - container in which type is set by hand - 41

composition - the setting up of type and its imposition: see also display, measure & justification - cost 9, text 31-42, method 41, scale rates for 351, & estimating & costing 353-6, foreign 51 98 123 355, consistency in 366

contents, list of 160 182 187

continuous tone - tone which passes gradually from shade to shade - & half-tone block 205, & printing processes 232, & collotype 238, & photogravure 243, & colour 248, & retouching 408

conventions & format 22 303-4, & margins 27-30, & text composition 100 126, & justification 116, & verse 122, & capitals 129, & headlines 137, & page numbers 138, & disconventions (cont.) play composition 142 162 336, & order of prelims 172 177, importance of 177-80, & first page of text 192, & recto 273 copper in line-blocks 202, in half-tones 207, in founder's metal 211, in electrotyping 213, hardness of 214, in multimetallic plates 238, & gravure 239 copy - see typescript and originals corrections - see also proof & retouch - to type 210, to stereos 212, to litho plates 236 370, to collotype plates 239, to gravure cylinder 242, & tone original 280, cost of 356, & specimen 368, & proof 369, & colour 411: tone correction in photolitho 234, in collotype 230, in gravure 241: colour correction 250 252-3 costs 353-4 357 counter - space wholly or mainly enclosed by strokes of letter - diagram 34, defined 35, and shading 65, and legibility 68, and emphasis 132, & comparative size 158, & paper 302, & colour 398 Cowell, W. S. 183 crash 323 cross-heads - subordinate headings usually centred across measure - 49 134-5 168 crown - paper size, 15" × 20" - 13 16-7 cut flush - text and cover cut at the same stroke - 332 cutting - cutting with guillotine - 16 24 220 318 Da Boll, Raymond 157 159 dandy - wire roller that presses down fibres during paper-making - 288-90 296 design - in line-casting 51, defined 145, Bodoni 145, use of 168; see also em rule Deberny & Peignot Foundry 148 mould or wire - 289 293-4: deckle-edge -

dash - here, rule whose length is fixed by its deckle - device to retain fibre on paper-making rough edge on paper where deckle lets some fibres through - 24 293-5 306-7 decoration 152-3, out of fashion 168, & titlepage 186, & colour 247, & illustration 263, in binding 305 320 329-30 dedication 173 177-80 deep-ctch, deeply etched - see under etching demy - paper size, $17\frac{1}{2}" \times 22\frac{1}{2}" - 13$ 16 De Roos, S. H. 156 descender - stroke descending below main body of letter: see also extender - & height of letter on body 33, diagram 34, defined 37, special long 39, value of 66 device on title-page 182, examples of 165 181

183, & colophon 196

diagrams 262-3

De Vinne, Theodore Low 160-1

dictionary 110 123 Didot body - body in French point size, larger than English - 99 101 395: Didot Firmin 93-6 102 die, die-case - see matrix, matrix-case display - setting other than text - 142-70, composition 57 142 153-60, & hire of matrices 58, & colour 247-8, & jacket 336-8: display type - type designed only for display or, usually, over 14-point - defined 39, for line-casting 50-1, attachment 58 distribution - return of type to source after usc - 42 44 division of words 113-6 doctor - blade for cleaning surface of gravure plate - 240 242 dot-etching - method of tone adjustment in litho - 234 254 drama 105 119 123 247 drawn-on cover - limp cover fixed to spine of book - 333 dressing - cover of press cylinder - 221 drop of chapter head 134: drop initials, see initials Dufaycolour 257 Duncan, Harry 264-5 duodecimo - page area one-twelfth of basic sheet size - 16 19 duplicate plate - duplicate printing surface prepared from type and blocks: see also electrotyping & stereotyping - 212-6, & type 210, & make-ready 220, & register 222, & colour 253, & cast-off 348, & costs 353, & standing type 356, & estimating 359-360 dust-wrapper - see jacket Dwiggins, W. A. 90 103

E

edge of page 266, colouring 320 educational books 352 Ehrhardt 84-5 91 102 106 189 396-407 eight-lead - 12-point lead - 36 Electra 103 396-407 electrotyping 213-4, & type 106 211, & hardness 214, & colour 258, & autographic illustration 276, & blocking 326 Elizabeth 152 Elzevir 176 em - type body or space rectangular in section - 33: em quad - space of em size: em rule rule one em long - 123 128 135 Emerson 71 100-1 106 114-5 396-407 emphasis & decoration 145, relative 158-60, & centred lines 162, & spacing 164-6, & ornament 168, & colour 184 247, & illustration 262, & jacket 337 en - type body or space having a set half its body - defined 33, & casting off 344, num-

ber in word 344, en-content of line 112-3

117-9 129-30 275 397: en quad - space of gram 34, on Monotype 54, in photocomen set - 33 position 60, & spacing 66, & legibility 68, & end paper - leaves between text and binding interlinear space 118, & measurements 396 313-4, & ornament 168, & half-title 172-3, 398 paper for 296, 300, & hand binding 306-7, flange 208 216 275 & case binding 319, & casing in 330-1, & Fleischmann, J. M. 91 limp binding 333, & jacket illustration 340, Fleuron, The 103 note: fleuron - printer's supply of 358, & estimating 360 flower, decorative type unit - Granjon 80, english - type body, about 14-point - 86 examples 130-1 149-63, in headlines 137, engraving 144 184-5 276-7 - see also metal, use of 168, & blocking 326 process, and mood engraving Flexiback - method of binding in which linen enlargement 269-72 replaces double lining - 332 Enschedé en Zonen 83 101 146 148 155 Flexlin 324 errata 191 flong - papier mâché used for stereo moulding esparto 284 292 296 - 212 Estienne 79-80 396-407 flower - see fleuron estimating 345 350-62 foil 327-8 etching 276: deep-etch - of blocks, etch away folding 312-3, methods of 14-6, & illustrations half-tone screen background - 208 316; 262, & India paper 297, & paper bulk 298-9, in litho, etch printing surface - 236-7 242; folding strength 300, in hand-binding 306, deeply etch - etch space between half-tone & imposition 311-2, & machines 312-3 dots to extra depth - 208: fine etch - adjust folio - page number, q.v.; here, page whose tones by etching block or gravure plate area is half that of basic sheet - 14 19 138 207 234 241 252-3: see also dot-etching foolscap - paper size, $13\frac{1}{2}"\times 17"$ - 13 16 exclamation mark 128 footnote 11 110 132 347 extended - of type, widened - 41 fore-edge - outer vertical edge of page - 14 extender - stroke extending above and below format - here, cut page size - 13-22 393-4, & main body of letter: see also ascender & type-face 69, & press size 227, & illustration descender - defined 37, length of 66, policy 262 267, & sheet size 299, & folding 313, for & interlinear space 117-8, & margins & board 321, & bulk 374 266: long extender 81 83 85 89 90 102-3 forme - the printing surface as imposed and 130-1: short extender 84 117 mounted in the machine - defined 42, & extent 69 imposition 217-9, & inking 224, planning extracts 129-32 of 230, printing rate per 360 extruder - see extender fount - all the alphabets of one size and one design - defined 37, constituents 37-8 48, F in line-casting 50-1, in series 39 70, choice of 111-2, for extracts 129, for notes 132-3, Fabroleen 324 & introductory text 190, & index 195, & Fairbank, Alfred 78 layout & specimen 368, wrong 369, & type Fair field 163 dimensions 395, text 403-7 family - group of type series related in design Fourdrinier - paper-making machine - 288-- defined 30, Plantin 81, Romulus 101 105, Times 105 Fournier 90-2 396-407, set of 54 note, popu-Farleigh, John 185 larity of 86 note: Fournier, Pierre Simon (le Jeune) 93-5 featherweight - paper which in 30×40: 60 lb Fowler, H. W. - Modern English Usage - 192 ream bulks about an inch per 320 pages - 283 296 fractions 104-5 Fell 148 French groove - sec American joint Friedlander, Elizabeth - 152 fibres 283-6 293 299-301 frisket - device for holding paper down during figures: illustrations 273-4: numerals 38, superior & inferior 38 104 133, modern etc printing - 225 frontispiece 173-80, & jacket 340 93 105, & letter-spacing 138, roman & arabic 188 Fry, Joseph 90 146 full-bound - completely covered in the same filling - casein etc in cloth - 322 material - 300 filters 252 256 409-10 fine etch - sec under etch full-point 126 133 furnish - material of which any particular finish - degree of smoothness in paper - 295 fitting - space between sides of letter and paper is made - 283 adjacent shank of type - defined 33, diafurniture - spacing material - 42 217

(

galley - long tray for containing composed type - 41 369: galley proofs - proofs from type in galley - 41 369 Garamond (type) 81-3 396-407, use of 86 note, italic 106, example 114-5: Garamond, Claude 79-80 83 86-7 gather - collect sections into correct order -Georgian 89-90 396-407 gilding 320 Gill, Eric & Perpetua 99-100 153, & Pilgrim 104, device 183, Floriated 154, Sans-serif glair - adhesive used in gilding - 328 Glasgow Letter Foundry 89 glossary 193 glueing 318-9 gold 309-10 327-8 Gollancz, Victor 338 Goudy: Italian Ohl Style 159: Modern 92 396-407: Open 92 goût hollandois 84 91 grain: of litho plate 236: of paper, defined 18 300, in colour printing 258, in papermaking 288, & hand-made 295, & offset paper 296 298, & endpaper 313 Grandjean, Philippe 91 Grange Fibre Company 324 Granjon 80 396-407: Granjon, Robert 82 84 86 148 gravure - see photogravure great primer - about 18-point - 86 Greek examples 46 150-1, on Monotype 54, on old bodies 57, in photo-composition 61, type for 64, Antigone 150-1 Gresham 146 Griffith, C. H. 85 Griffo, Francesco 78 grippers - mechanism for gripping sheet during printing - 220 227; gripper edge - edge of paper fed to grippers - 220 222 Gross, Gerald 268-9 guarding - sewing a single illustration plate

Η

into the book - 176 313 315-6

Haas Foundry 148
Hadank, O. H. W. 152
hair: hair lead - 1-point lead - 36: hairline thinnest part of letter other than serif diagram 34, defined 35, printing of 65 70-1,
& paper 105, & type design 106, & type
measurements 395: hair-space - space onesixth of the body or less - 35
half-bound - bound with spine and corners in
one material, the rest of the cover in another
- 309

half-sheet work - using one forme only for both sides of the sheet: also work-and-turn - 218 348

half-title 172-7 192

half-tone – process by which continuous tone is simulated by pattern of dots of varying size: see also screen – & litho 234–5, & silk screen & invert 242, & colour 248, & reduction 270, & reproductions 280, & paper 292 296–8 302, & cloth 329, & proofs 369: half-tone blocks 205–9, & paper 105 186, combined with line 208, & stereos 212, & clectros 213, & make-ready 221, & set-off 223 230 272, & double-tone ink 224, & colour 252–3, & paper finish 301

Hammer, Victor 114-5: Hammer Uncial 156 hand-made paper - 221 293-5, & fibre 284, & plate glazing 291, & vellum 297, & binding 299, & grain 300

hand-press 17 221 225 228

Hart, Horace - Rules for Compositors and Readers - 125 note, 129 194

head 14 headbands 308–20

headings – 133–5, marginal 24, & extent 69, & type 105 158, cut-in 134, & indention 139, in prelims 187–8, & introductory text 190: chapter headings 133–4 139–41, & page numbers 138, & ornamental letters 155, & ornament 168, in list of contents 188, & illustrations 266, & specimens 368, & proofs 369

headlines - repetition of title of book, chapter etc on pages following the heading - 135-7, & page depth 33, & sloped small caps 49 105, & text area 109, & cross-heads 134, running 136, & page number 138, & catchword 139, & inking 225, & margins 266, & layout 363, & specimens 368, & proofs 369

Hebrew 46 58-9 64 hemp 284 296

Hever Titling 39 404-7

hollow - paper reinforcement f spine of case - 338-9 324-5 328

hook - see wrap round

Ι

illustration – see also artist, autographic illustration and originals – 260-282, in typescript 11, & format 21, & margins 24 27 110, & textrun round 116, & text references 129, & backing 189 318, list of 190, acknowledgements 194-5, & half-tone screen 206, & make-up 230, & gravure 241, & silk screen 242, & collotype 243, & colour 246 248, & tone 279-281, & paper 302, & jackets 337-340, fees for 366, & layout 363, & proofs 369-370

imitation art paper – heavily loaded and highly calendered paper – 206 288 297

imperial - paper size, 22" × 30" - 13

imposition – arrangement of pages in positions in which they will be printed – 217-20 311-2, & corrections 11, & composition 42, & text area 110, & verse 122, & estimating 359, & printer-binder 366, standards in 367

impression – pressure with which printing surface & paper meet – adjustment of 210, & type 211, & make-ready 220–1, & running 223, & hand-press 225, planning of 231, & colour 252, & hand-made paper 295

Imprimerie Nationale 82 148: also Imprimerie Royale

imprint setting of 158, & American law 186, & back of title 187, correction of 191, & colophon 196: Imprint type 41 86 note, 98 396-407: Imprint, The 98

in-boards - binding with text laced to boards -

indention 118-9, example 28-9, & verse 122, & drama 123, & extracts 129, & side-heads 134-5, & chapter-head 139, & initials 140, in abbreviations 193

index 195-6 110 138 312: index-marks 133 India paper - a kind of extreme thin paper of high quality - 284 296-7 299

initials 140 152 163 247 369: initial letters 126

ink double-tone 224 227, & colour 245-6 248 258-9, trichromatic 249-56 409-11, letterpress & water-colour 252 276, & gravure 255, & blocking 327, & jacket 337 339, & estimating 360: inking 223-5, & types 68, & multimetallic plate 238, & collotype 239, & gravure 240, & silk screen 242, & illustration 263, & hand-made paper 295, & type & blocks 338

inset - placing a section or plate inside a section for sewing or stitching - 332

intaglio - see recess processes

interlay – make-ready by means of varying thicknesses between block and mount – 221

interlinear space 70 116-8 275; see also leading Intertype 43-51 75: Intertype Fotosetter 59-60 Ionic 102

italic – originally an Italian cursive handwriting of the 14th and 15th centuries, now usually understood to mean almost any inclined character: see also *chancery* – defined 36, in line-casting 48-9, design of 64, development of 75-107, in drama 123, in head-lines 136, economy in set of 160, in notes & abbreviations 193, with roman caps 264-5, hand-writing 281, & spines 330, & type measurements 401-2 Ī

acket 335-43, & fleurons 168, & title-page, 184, & advertisement 194, & colophon 198, & silk screen 242, & stone lithography 254, paper for 285 293 296 358, & binding 310, & estimating 360-1, & layout 365, & dummy 369, & reprints 370

Jannon, Jean 82 91

Janson 84-5 396-407, examples 49 269, & Times 102

Jennett, Seán 136 note

Jenson, Nicolas 77-8 87 Johnson, A. F. 81 note, 85 note

Jones, George W. 79-80 89

justification – adjustment of spaces between words so that adjacent lines are equal in length – defined 41, reason for 42, in linecasting 44, on Monotype 51-2, in photocomposition 60, & word-spacing 113, examples 114-6 264-5

K

kern - part of letter that overhangs shank diagram 34, defined 35, in line-casting 49, on Monotype 54-5, in photo-composition 60

keyboard 47 Klang 152 Klingspor Foundry 148 152 156 Koch, Rudolf 150 Krijger, Henk 154

L

label 328

laid paper - paper made with a dandy roll having a rectangular wire pattern - 196 289 laminating 342

landscape - wide shallow page - 16

Langdon-Davies, B. N. 335 note

large post - $16\frac{1}{2}$ " × 21" - 10 13

Latin 114-5

lay-edge - edge of sheet which is laid to the side-lay in printing - 222

layout 363-5 369

leader - 2 or 3 points on one shank - 188

leading – inserting space between lines of type: see also interlinear space – & margins 26, sizes of 36, & extenders & fitting 66, & extent 69–70, & type-design 89, & Bodoni 96, & text area 110, & indention 118–9, & verse 122, & two columns 124, & extracts 129–132, example 163, & list of contents 190, & list of abbreviations 193, & index 195, & paper 298, & layout 363, & specimen 368

lectern 111 Legend 156 424 legibility causes of 63, & type-faces 67-9, & aesthetics 72, defined 108, how obtained 109, & measure 110, & justification 116, & interlinear space 116-7, in display 156 162, & notes 193, & impression 221, & multimetallic plates 238, & colour 247, & illustrations 272, & paper 302, & binding 328, & jacket 336-7, & flat opening 374 Legros, L. A., and J. C. Grant - Typographical printing surfaces - 33 note Le Royer, Jehan 181 letter-design 34-5 64-7 72-3 lettering & artists 184, & title-page 184-5, & calligraphy 281, & spine 329-330, & jacket 335-8, & type 336 letter press printing - printing from a relief surface - 210-31, & type 70, defined 200, advantages of 243, & colour 245 252-4, & line illustration 277-8, & tone illustration 279-80, & paper grain 300, & paper finish 301, & cloth 323 329, & jacket 341, & costs

letters pacing - spacing between letters within a word - need for 35-6, on Monotype 55, of lower-case 116, in drama 123, & page numbers 138, & display 143 164-5, examples 163 169, & layout 364

Lewis, John 183

Libra 156

library & rebinding 23 136 322 370, & colophon 199, & library binding 310, & deterioration 314, 324, & form of book 374: library binding 305-310

ligature - letters joined to each other and cast on a single shank - 38 80 82 90

limited edition 214 276 305: Limited Editions Club 104

line (of words) 119-20 160 188: line, the (in type-face) - base of main body of letter -33-4 64

line-block - photomechanical reproduction in relief of black and white drawing - & display 153, & title-page 186, manufacture of 201-3, combined line & half-tone 208-9, & stereos 212, & electros 213, examples of zinc & magnesium & line illustration 278, & transparent originals 279, & paper 296, & blocking 326, & cloth 329

line-casting - casting a whole line of type with a single injection of metal - 43-51

linen 284 293 319

lining - reinforcement of spine with paper and glue - 319-20 332

Linline 324

lino cut 214 276-7

Linotype 43-51, type range 75, display capacity 143, type metal 211, casting off 346, & type measurements 395 398: Linotype Filmsetter 60

Linson 324

lithography - see autolithography, chromolithography & photolithography liturgical books 19 247 loading - addition of minerals to paper fibres -287-8 291 296 301 locking up - wedging type etc into the chase -42 216-7 long primer - about 10-point - 32 look-through 285 289 291 lower-case - minuscules - 66-7 129 158-60 399-400 Luce, Louis 91 Ludlow 143 Lutetia 99 155 167 396-407 Lydian 152

M

machine-direction - see grain machine-finished - paper calendered only on the Fourdrinier - 106 206 296 machining - see presswork and printing magazine (of composing machine) 44-8 main line - see line, the main-stroke - principal and usually thickest stroke of letter - diagram 34, defined 35,

printing of 65 71, in capitals & lower-case 66-7, & inking 225, & type measurements 395-6

ma juscule – see ca pital

make-ready - preparation of printing surface for printing - 220-2, & Monotype 57, & wear on type 211, & stereos 212-3, & perfectors 230, & printing processes 231, & collotype 239, & colour 252-4, & bleeding 266, & estimating 360

make-up example 130-1, & notes 132-3, & collotype 243, & captions 275, standards of

manuscript - see typescript

marginal headings 135: marginal notes 132 230-I

margins 23-30, & extent 69, & text area 109, & two columns 124, & notes 132, & page number 137, & aesthetics 166, & title-page 182-3, as unprinted paper 137, & imposition 217, & illustrations 266, 273, & deckle edge 293, & paper 298, & side-stitching 332, & layout 363, & specimens 368, & proofs 369 Martin, Robert & William 90

masking - device for tone & colour correction - 234 252

Mason, J. H. 98

mathematics 58 64 97 355

matrix - here, typefounding matrix from which the type-face is cast - defined 31, & line-casting 43-9, duplex 44-5 48-9, display 48, hire of 58, matrix slide 145, & composition of 145, & decoration 153, buying 355, & specimens 368: matrix-case 51-4 57 128

matt art - art paper with matt surface - 206 242 N maturing (of paper) 202 measure - width in which type is composed -Nebiolo Foundry 95 148 defined 33, in hand setting 41, in linenegative exposure 201-2, mounting together casting 50, on Monotype 55, description of 208, combined line & half-tone 208-9 235, 1 10, & reading methods 1 12, & justification & photolitho 234, & collotype 238-9, & 116, & interlinear space 117, & indention gravure 240, & colour 256 410 Newdigate, Bernard 247 118-9, & reference books 124, & cut-in notes 132, & list of contents 188-90, & news print 197 illustrations 272, & captions 275, & layout nickel-facing 213-5 363, & specimens 368 nipping - crushing air out of book - 317-8 mechanical stipple - stipple transferred from Nonesuch Press 22 90 92 149 183 a sheet: also Ben Day tint - 203-4, & colour non pareil - about 6-point - 32 248-9 252 256, & diagrams 262, & line note - see also footnote - 132-3, marginal 24 illustration 279, & jacket 340, & cost 356 110, example 130-1, & page numbers 138, medium - paper size, 18" × 23" - 1316: medium & back pages 192-3, & calligraphy 281 space - usually 4 to the cm - 35 novel & format 21-2 393-4, & extent 69, & metal-see also Brinell-31 211, in linebulk 200, & cast-off 348, & proofs 355 casting 50, on Monotype 57, electro and numerals - see figures stereo 214, mounting on 216 221, engravnut - see en ing 276 Meynell, Sir Francis 130-1 150-1: Meynell, O Gerard 08 M F - see machine-finished oblique 105 Miehle press 229 oblong 16 millboard 321 octavo - page having area one-eighth that of Miller, William, & Co - also Miller & Richard basic sheet - 15-6 19 22 - 96-8 102 oddment - sheet containing fewer pages than Milskin 324 the other sheets in the book - 348 minuscule - sec lower-case off-centre setting 162-3 166 168 mitre - diagonal cut off corner - 324 offset - see photolithography: offset paper 284 Modern Extended 64 97 396-407 206 modern - type-face having vertical stress and old face - type-face with oblique bracketed horizontal top serifs - 76 or 93 serifs and oblique stress - 76, defined 78, Monotype 51-9, Monophoto 60, preference for italic 80, 91, development of 87, & lead 89, 82, introduced 98, & word-spacing 113 121, revival of 97, & superior figures 133, & set & indention 118-9, & punctuation 128, 396: Old Face Special 87-8 396-407 composition caster 243, large type comold style - type face revived from 19th century, position 143, & hire of matrices 144, metal usually with oblique serifs, vertical stress 211, & casting off 346-7, reverse gear for and shorter extenders than old face - 72 355, & set 396: Monotype Corporation type 97-8 396-497 programme 58 81-2, type range 75, & opening - two facing pages - 26 137 180 181 optical centre 184 272 Times 102, matrix policy 105, & type measurements 395 398 originals - see also photographs - line 201, Morison, Stanley & type design 82, & Caslon half-tone 205, pencil 207, & deep-etched 86, & Fournier 92 note, & Times 102, & blocks 208, grouping 209, fine line 235 275, sloped roman 103, quotation from 180 transparent 237, & colour line 148-9, & continuous colour 253 255-7, proportions Morris, William 27 121 177-80 266, & enlargement 267 270, autographic mortise - cut into - 141 143 mosaic transparency - colour transparency 276, photomechanical 277, & screen 280, mixing colours in mosaic pattern - 257 reproduction with text 316, costs 357 ornament 142-70, in line-casting 51, & page mould: for duplicate plates 57 353 356 359: in number 138, & jacket 338-40, & layout type-founding 31-24451: in paper-making 293-5 300 364-5 ornamental letters 155 168 mount 203 208 216 220-1 Moxon, Joseph 1 86 Ornata 152 mull - muslin for reinforcing spine - 313 319overlay - adjustment of impression by thickening cylinder packing locally - 221-2 20 331-2 oversew - method of sewing single pages tomusic 237 296 mutton - see cm gether - 317

Oxford hollow - paper-lined hollow back in hand-bound book - 308-9

Oxford University Press - see under University Press, Oxford

P

packing – covering of press cylinder – 221 223
page depth of setting 33, division into 41, size
of 299: page headline 136: paging 191 274:
page number 137-9, position 24, & text
area 109-10, in list of contents 188, & list
of illustrations 190, & prelims 191-2, & appendixes 192, & inking 225, & margins 226,
& illustrations 274, & layout 363

paper - see also antique, art, bar yta, cartridge, chromo, coated, featherweight, hand-made, imitation art, India, laid, machine-finished, matt art, newsprint, offset, sheet sizes, super calendered, & move - 283-304, grain 18, & type-faces 68 70 112 231, & bulk 69, & impression 71 221-2, modern tendency in 105, & frontispiece 176, & colophon 198, & line-block 204, & half-tone 205 231, & block proofs 209, & letterpress 210-1, & bleed 218-9 266, & ink 223, & offset 235, & colour 246-7 253-4 258, & illustration 263 272 278 316, wrong side of 289, twinwire 290 296-7, & binding 306 313 326 332, & jacket 339 341, & reprints 340 370, & costs 353 357-8, & specimens 363

paragraph mark - ¶ - 119: paragraphs 118

parchment 297

parentheses - () - 123

peculiars - see special sorts

Penguin Books 22 153 333

perfect - form of binding in which separate pages are glued together at one edge: also unsewn binding - 306 332

perfector - press which perfects, or prints both sides of, the sheet while it passes once through the press - 223 229-30 296 360

Period Old Style 98 404-7

Perpetua 99-100 396-407, bold 65, use of 86 note, italic 106, examples 130-1 152

Phoenix House 183

photo-composition 59-61 231

photographs & gravure 242, & trimming 270, & placing 272, & tone reproduction 280, & costs 356

photogravure – process of printing from photomechanically prepared surface in which ink is contained in recessed cells – 239-42, & photo-composition 60, & type 72 81, use of 243, & colour 245 253-5, & set-off 272, & line illustration 278, & tone illustration 279, & reproductions 280, paper for 284 297 301, & jacket 341

photolithography - process of printing from

plane surface photomechanically prepared, on which printing areas are greasy and non-printing areas are damp – 233–8, & type 71–2 81, use of 243, & colour 245 253–5, & autographic illustration 276–7, & line illustration 277–8, & transparent originals 279, & calligraphy 281, & paper 284–5 300–1, & cloth 322–3 329, & jacket 340, & proofs 363–70

Photon 60-1

pica – about 12-point: as 12-point, used as a unit of typographical measurement – 32 Pickering, William 87 97

Pilgrim 104 396-407

pitch-line – line across bed of press to show how far printing-surface can extend without fouling grippers – 227–9

planographic - see surface processes

Plantin 81 396-407, x-height of 70, & paper 71, use of 86 note, & Times 102, proportions of 106, & verse 119, examples 128 130-1

plate, illustration printed separately from text – 314-6, numbering of 138 274, & list of illustrations 190, & colophon 198, & paper 293 297 303 358, & imposition 311, folding 316, & estimating 360, & tenacity 370: plate-glazing – method of smoothing paper surface – 291-2 295: see also albumen plate, duplicate plate

platen press – press which brings paper and printing-surface together as plane surfaces – 225-6 228

plays 105 119 123 247

poetry - sec verse

point: in punctuation, 105 188: in measurement - 01383", or about one-seventy-second of an inch, unit of typographical measurement - 32 93

Poliphilus 79 396-407, use of 86 note, proportions of 106, example 264-5: see also Blado

Pollard, Alfred 92

portrait - format or illustration deeper than wide - 16

positive 202 236-7 240

post - paper size, 151"×19" - 13

pott – paper size, $12\frac{1}{2}" \times 15\frac{1}{2}"$: also pot – 14 prayer books 140

preliminary pages - also prelims - 171-99, & measure 1 10, & page numbers 138, & signatures 139, & margins 166, printing of 191, & imposition 312, & proofs 369

press (machine) - see under printing: private press 24 221

pressing 331

pressmork - see also printing - & Aldine type 78, & Garamond 82, & paper 106, 303, & hand-made paper, 295, & colour 366-7 primary colours 408-10

printer & device 182, jobbing, general & colour printers 148 366-7, & prelims 191, & colophon 197, & paper 206, & block proofs 209 369, & imposition 217-9, & collotype 239, & ink 250 258, & colour blocks 253, & jacket 338, & casting off 345 347, & even working 349, & scale rates 351 359-60, & estimate 355, & paper 358, choice of 365-7, & specimens 367-8

printing - sec also impression, ink & pressmork - fine printing 72, & line-block 204, by letterpress 210-31, from stone 233, in colour 254-5 257-9, & bleed 266, & paper 287, & watermark 290, & India paper 297, & costs 359-60: printing press - see also rotary, persector & platen - cylinder 17-21 227-30, & imposition 219-20, & makeready 220-2, stop-cylinder 226, two revolution (Miehle) 226-30, & sheet size 299, & capacity 348, & estimating 360: printing processes & type 70, letterpress 210-31, & frontispiece 176, photo-litho 232-8, collotype 238-9, photogravure 239-42, silk screen 242, choice of 243, & colour 245, & line illustration 277-8: printing-surface deterioration of 70 106 138 208 211-2 214 236 230 242 251-2, & letterpress 200 214, type as 210, hardness 216, area of 217, & make-ready 220-2, & inking 223, & press capacity 228, & colour 249 410, autographic 276, & illustration 277

process engraving camera for 201, & paper 206, & colour 250 253 258, & scale rates 351 356-7 367, & proofs 369

proof 369-70, corrections to 11, slip, galley, page 41 136 369, & line-casting 50, & Monotype 57, reproduction 59 237 356 370, before reprints 191, & index 195, & blocks 209, & type 211, & colour 253 256-9, progressive 258, & illustration 266, cost of 355, publicity 355, & reading 365-6, engravers' 369

publisher & device 182, & prelims 191, & acknowledgements 194, & colophon 197, & machining charges 230, & watermark 290, & jacket 336-7, & even working 349, & specimens 368

pull - see proof

pulp 283-9

punch – character engraved in relief in hard material for forming matrix by being struck into less hard material – 31 43 99

punctuation 39, & spacing 54, new marks 105, & word-spacing 113, & style 126-8, & index 195, & specimen 368

Pyke, R. L. 67 note

O

quad, quadrat: in composition, see under em and en: quad as paper size 18 138

quarter-bound – bound with spine in one material and rest of cover in another – 309 325

quarto - page area 1 that of basic sheet - defined 15, use of 19 22, & 2 columns 20 69 124, & folding 313

quire - one-twentieth part of a ream, usually 25 sheets: also section - 139

quoin – wedge for locking up in chase – 42 217 quotations 123 125 129–32 quotes 125 127 120

R

Rassia 154 raised bands 307: raised initial 140

reader & title-page 184, & list of contents 187, & introductory text 190-1, & acknow-ledgements 194-5, & figure numbers 274, & captions 275, & plates 315: reading methods of 112, & justification 116, aloud 119, & verse 121 note, & extracts 129, & notes 133, & headlines 135-6

ream - a parcel of paper, usually of between 484 and 516 sheets - 357 360

rebinding 23 139 266 314

recess processes – printing techniques such as photogravure in which ink is contained in recesses in printing plate or cylinder – 239–42, & type 106, & colour 255, & illustration 276–7

recto - right-hand (page) - 26 177 273 316 reduction 269-72 277-9

reference, books of 119 123-4 135-6 323: re-

ference marks 38-9
reflection range – range of light radiations reflected by a surface – 250-1 254 410

register - relative position of 2 or more printings - & make-ready 22, & perfectors 230, & colour 247-9 256-8, marks 256, & paper 300, & estimating 360: register - book marker - 319-20

reprint & printing surface 210-1 214, & bulk 340, & imposition 359, & quality 370

reproduction, reproduction of a 280, proof 237 356 370

retouch – adjust by hand photographic transparencies in process work – in line work 202, & photolitho 236, & gravure 243, & colour 252-3, & tone 280, reason for 408 reverse – in process engraving, turn from left

reverse – in process engraving, turn from left to right or from black to white by photomechanical means – 201-2 279 337

river - several adjacent word-spaces in successive lines of type - 113

Riverside Press (of America) 87 note Rogers, Bruce 77 85-7 147 182-3 373

rollers & type 138, slit 224, & inking 225, & pitchline 228, & gravure 240

romain du roi 91-3

roman – upright type as used for the text of books in Britain etc – defined 36, sloped 36 49 100-1 103-4 106, development of 75-107, & italic 401

Romulus 20-1 101 105 120 155 165 396-407 Rosart 146

Rosner, Charles 335 note

rotary press - press in which paper and printing surface are both mounted on cylinders -229-30: rotary photogravure - see photogravure

Rotofoto 60

rounding - shaping back of book into convex curve - 308 318 332

royal - paper size, 20"× 25" - 13 16

rubber 276

rules 144-5, in line-casting 51, in punctuation 127, & notes 132, & headlines 137, & title-page 184, example 149, & 2 columns 195 Ryder, John 183

S

Salter, George 46: Salter, Stefan 163
sans-serif - type-face without serifs - example
28-9, defined 66, & Romulus 101 155, &
text 109, for spine 330
S. C. - see supercalendered
Schneidler, F. H. E. 156
schoolbooks 66 68 111
Scotch Roman 90 96-7 132 396-407
scraper-board 278

screen - transparency so ruled that on passing through it tones are broken up into dots of varying size - 205-7, & printing 231, & photolitho 235 238, & collotype 238, & gravure 240-2, & colour 252-3 255, & reduction 270, & artist's work 277, & tone illustrations 280 316, & cloth 329

script - usually, a type based on a handwriting first used after the invention of typography - 155

section – a printed sheet after folding: also sheet – parts of 14–5, defined 13, & page numbers 139, & imposition 218 311, position of illustration in 262 311 315–6, & number of pages 299 313, & sewing 317, inset 331–2, continuous 332, & casting off 348, unevenly sized 349: section headline – headline which refers to the section of text below it – 136

selvedge 321

semi-bold 41, in line-casting 49 102, on Monotype 58, Romulus 101, italic 103

series - set of founts related to each other in design but graded in size - 39 50-1 132 395 serif - small terminal stroke at end of main-stroke - 34-5 65-6: top serif - serif at top of main stroke - 34-5 88 91-2

set - width of type across shank: in Monotype,

width in points of 18-unit character - defined 32-3, Monotype 52-4, alternative 58, & apparent size 70, & measure 112, 119, & casting off 347, & measurements 306-7

set-off - print from a printed surface, as for instance from a printed sheet on to the next sheet in the pile on the delivery board - 223 227 230 272

sewing 310 317-8 331-2

sexto – page whose area is one-sixth that of the basic sheet – 16 19

shading – gradual thickening of curved stroke as it turns away from about 45° (in old face etc) or from horizontal (in modern etc): also stress – 34 65–6 88–9 91

Shakes peare Head Press 247

shank - main body of type which raises printing surface to correct height - 32

sheet - see section: sheet sizes, principal 13-4, multiple 17-8, proportions 21, & register 222, & press 227-8, & page 299, & printing scales 360: sheet work - printing the two sides of the sheet from two different formes, also work and back - 217-8

short letter – lower-case letter without extender – size on body 33, importance of 37, & interlinear space 118, & margins 266 272: short lines 360

shoulder head 135 show-through 187

side-head 134-5 168

signature – letter distinguishing each section from the next: also section – 13 15 137–9 369

silk screen – printing process in which ink is brushed through a stencil supported on a screen – 242 256 329 339 341

Simon, Oliver 125 note, 171-2 177 187 size – water and oil-resistant added to paper – 297-8, animal & 116 291 295, & litho MF

297-8, animal & 110 291 295, 296-7, & durability 301

slip-case 342-3

slitting 227

slug – line of type cast with a single injection of metal – 44-5 212

small capital 129-32, defined 36, in linecasting 48-9, sloped 49 83 85 101 104-5 133, & initials 140, & half-title 173, & list of contents 188, & roman 402

space - rectangular piece of metal, less than type-high, for adding space between words and letters: see also justification, letter-spacing, & word-spacing - defined 33, sizes 35-6, in hand-setting 41 57-8, space-bands 44 49-50, in line-casting 49-50, fixed 50 55, variable 51 55-6, on Monotype 55-6, & fitting 66, & display 143 164-6, brass 143, rising 210, & electrotyping 211 214, & layout 364, & specimen 368, & proof 369

special sorts - characters other than the normal

make-up of a fount: also accents, arbitraries and peculiars – defined 39, example 46, in line-casting 48, on Monotype 58, series with 97-8 102, in the future 104

specimens 345 347 363 367-9

spectrum 246 249 408 410: Spectrum (type) 104 396-407

spine & decoration 168, & title 174-5, & binding 308-9, & case-making 324-5, & lettering 329-30, of jacket 337-8, & dummy 369, & paper 370

Spiral Press 100

spool 51-2

square - edge of case projecting beyond edge of page - 308 325

squash – spread of ink outside area of contact between paper and printing-surface – 71 105-6236252-3

stem - see main-stroke

Stempel Foundry 84-5 148

stencil - see also silk screen - 242 251-2

Stephenson, Blake & Caslon 86, & Georgian 90, & Bell 94, & Pilgrim 104, & Fry's Ornamented 146, & Chisel 155

stereolyping – preparing duplicate printing surface by means of pressed mould and casting – & type 70 81 106 212-3, & reprints 211, & nickel-facing 213, & chromiumfacing 213, & hardness 214, example 215, & water-colour inks 252, & colour 258, & blocking 326

Stevens Shanks 146

stipple - sec mechanical stipple

stitching 331-2

stone, imposing 217, lithographic 233-4 237 254: Stone, Reynolds 183

straw 284-5 292 296: strawboard 321

stress - see shading

sub-head 134 368

supercalendered - paper given extra smooth finish by separate calendering - 206 223 291-2 297

surface processes – printing techniques in which printing and non-printing surfaces are in the same plane: see collotype & photo-lithography – 232–9, & type 106, & paper 290 296 301

smash – flourished letters, additional to fount of ordinary letters – defined 39, Granjon 80, Garamond 82, Georgian 90, Lutetia 90

T

Tagliente, Giovantonio 78 tail – foot of page – 14 tapes 313 317-9

text composition 31-42, types for 62-107, design principles 108-124, area on page 109-10 134 267 272 275, design details 125-41, importance of 142, introductory

190-2, first page of 192, & colour 247, & illustration 266, on jacket 336-8: *textbooks* 24 187

three-quarter bound – bound with corners and spine covered in one material, the rest of the cover in another, the first material being more generously used than in half-binding – 300

Times New Roman 102-3 396-407, example of 39 117 128, x-height 70, & paper 71, popularity of 86 note, Hever Titling 103, design of 105, & punctuation 128: Times, The 97 102

tint - see mechanical stipple

tip in – fix into section by pasting along one edge – 176 315: tip on – fix to outside of section by pasting along one edge – 172 313 titanium – whitening agent for paper – 287 296

title-page 180-6, founts for 143, examples 147
149 157 165 167 174 178 181 185, & spacing
164, & margins 166, & ornament 168, &
endpaper 172, & facing page & doublespread 173, & frontispiece 176, & dedication
177, back of 186-7, list of contents on 190,
colour on 246-7, & jacket 340

titling – fount of capitals only, each occupying nearly the whole body – 58 79 148 152 tool – impress cover of book with heated tool –

tops & tails - see preliminary pages & back pages

transfer 234

transitional – type-face of the transition period between old and modern face, with oblique top-serifs and vertical stress – 88

transmission range - range of radiations which pass through a transparent object - 408 trim of illustrations 267-272: in binding - cut off bolts with circular knife - 311-2 318
Tschichold, Jan 167

two-sidedness 288 290 301

type defined 32, sizes 40-1, foundry 50 144, printing from 210-2 230-1, & batters 212, duplicating 213, & imposition 217, & photolitho 236, & collotype 239, & gravure 242, & silk screen 242, & colour 248, & illustration 278, & paper 296-8, & blocking 326-7, & cloth 329, & spine 330, & lettering 336, standing 356 359, measurements of 395-402: type-face & margin 26, condensed 41, & Monotype 54-5, choice for text 62-107, availability of 63-4, design of 64-70 104-7 111, measurement of 68, apparent size of 69-70 III-2, use of 70-2, classification of 76, & legibility 109, size of 111-2, for verse 119, & 2 columns 124, mixing 153, & colophon 198, & make-ready 221, & duplicating 231: type-founding technique 31-2, & Garamond 79, in Britain 85, active foundries type (cont.)

145-52: Typefoundry Amsterdam 148 154 156: type-height - 0.918" in Britain - 32 216 220-1: type-metal - see metal

typescript 9-12, short 24, & jacket artist 340, & casting off 344, good & bad copy 345 355 typographer duties of 7-8, & style & punctuation 125-6, & display 142, & handwriting 156, & colophon 197, & colour 245, & illustration 260-2 266 277-8, & calligraphy 281: typography colour in 246-8, & illustration 263, rewards of 372

U

uncial 88 underlay - bring up to type-height and cause to stand square by pasting paper to mount of block - 220-1 underline - see caption Union Pearl 146 unit - in Monotype, the fundamental unit is one-eighteenth of one point, & all characters are cast in sets which are multiples of this fundamental unit - 52-4, adding 55, 128, & punctuation 128, in display 143, & set 396: unit cost - cost per copy - 351-4 University Press, Cambridge 83 89 125 146: University Press, Oxford & type-height 32, old bodies at 57, & Chinese 59, house style at 125, typographic material at 148 unsewn binding 306 332 Updike, Daniel Berkeley 56 73 85 112 372 upper-case - capital letters - 36 Upton, P. G. B. 314 319 322 324

V Van Dijek 83-5, 396-407, small caps of 37,

example 56, & Caslon 85 87

Van Krimpen, Jan and Van Dijck 83, and
Lutetia 99, & Romulus 101, & Spectrum
104, & punctuation 105, & chancery 106,
& verse 120, & Open Capitals 150-1 155,
& Lutetia Open 155, examples 20-1 165

varnishing 296 342

vellum 297 323

venetian – type-faces based on roman types
designed before 1495, usually Jenson's

designed before 1495, usually Jenson's roman, & having capitals up to ascender line and oblique cross-stroke to e - 77-8 verse 119-22, & format 21, & margins 27,

type for 67, & measure 110, examples 20 121 150-1, in drama 123, & cast-off 348 verso - left-hand, or back of, page - 26 177 Victorian 90 vignette 208

W

Walbaum 93-4 396-407, use of 86 note, example 127, different series 153 Warde, Beatrice 82 101 113 Warde, Frederic 77 warp of cloth 321-3, of board 313 321 331 matermark 285 289-290 293 meft 321-3 Weiss Initials 152 260 Wharfedale - stop-cylinder press - 226 228 white-back - cheap grade of cloth - 322 Whittingham, Charles 87 97 Williams, Wightman 264-5 Wilson, Alexander 80 96 mire 288-9 296 Wolpe, Berthold 152 mood: in paper-making 284-5, chemical 285-6 292, mechanical 285-6 292 296, sulphite 285 292 296, use of 303: mood-cut 213-4 252 276: mood-engraving 276-7, & electros 213, & printing 214, example 215, & colour 252, & scraper-board 278 word-spacing 113-5, & justification 116, & fitting 118, & verse 119-120, in display 143 164-5, & double-spread title 180, & cast-off 346, & specimens 368 mork & back - see sheet mork work & turn - see half-sheet work morking, even - 196 348-9 move - paper made under a dandy having a fine diagonal mesh - 93 289 296 mrapper - sec jacket wrap round - wrap plates round section - 315

X

x-height – height of short letters in fount – defined 33, & languages 64, & legibility 68, & apparent size 70 111, & interlinear space 118, or small founts 195, & layout 363, & measurement 395-7 399-401

Z

zinc 202 207 214 234 zinco – see block & line-block PRINTED IN
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TO THE
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